

Sales Contest Material—Missouri Style



James & Co., G-E St. Louis distributor, represents his campaign quota in the G-E spring sales contest with a "Missouri" mule. Here is the "quota nag's" keeper, none other than Ham Dunlop, manager of range sales.

Combined Grocery-Appliance Dealer Enlarges Space & Adds Model Kitchen

ARNOLD, Pa.—Combining grocery and electrical appliance selling, W. R. Gott, retail grocer and electrical appliance dealer, recently expanded his store to provide more display facilities for his two lines of business.

He secured the store next door and moved his appliance section there. The two rooms are connected by large archways to allow easy access from one store to another.

Dominating the new display room is a complete model electric kitchen, equipped with a Westinghouse refrigerator, range, dishwasher, food mixer, toaster, and other small appliances.

Approximately 8,000 people attended the opening of the new store. Six demonstrations of food products, ironer and other appliance demonstrations resulted in the sale of \$1,000 worth of equipment.

In 1914, the Gott grocery store was opened in a room 18 by 20 feet, with a cash capital of \$600.

In 1931, Mr. Gott's contact with women in his enlarged and remodeled grocery store started him thinking about his possibilities in the electrical business. He concluded that, since women are the purchasing agents for the home, and since they deal with the grocery store more frequently than with other outlets, the store would be a logical place to interest them in electric devices for the home.

He started with a washing machine franchise, and reached a sales volume of 400 units on this item in 1934.

Mr. Gott has found the grocery store the best source of prospects for appliance sales. For instance, a few years ago a woman from a neighboring town stopped in the store to buy a loaf of bread. While she was waiting for her change and her purchase to be wrapped, she showed interest in an ironing machine on display at the front of the store. Mr. Gott immediately explained its operation, and secured permission to send it to her

home for a demonstration. Before the end of the week he had closed the sale for \$160.

Sales effort of this store is not confined to floor selling. When he took on a line of Westinghouse refrigerators, Mr. Gott had two men selling outside on major appliances. These men did cold canvassing in Arnold and New Kensington, Pa., and followed leads secured from the grocery department customers.

Spare Change Banks to Be Used in Promoting Crosley Sales

CINCINNATI—Use of a "Shelva-Bank" in which the buyer of a Crosley electric refrigerator may deposit savings from daily change, and thus pay for his refrigerator, is a new plan announced by the Crosley Radio Corp.

This method of payment enables the buyer to purchase a Crosley Shelva-Bank with money that would be spent on ice. Since the operation of the Shelva-Bank is not dependant on daily deposits, this plan differs from the coin meter plan.

To promote a new Shelva-Bank sales method, a newspaper campaign has been prepared in which a series of two and three column advertisements, nine and 10 inches deep will be run in local newspapers by Crosley dealers in cooperation with distributors, and the Crosley Radio Corp.

Featured in these advertisements is the claim that a householder may own a Crosley refrigerator for as little as five cents a meal. Other points stressed are the extra space in a Shelva-Bank, and the fact that the housewife may buy a Shelva-Bank with or without making a down payment.

Three Group Leaders Lose Top Places As G-E Sales Race Grows Hotter

CLEVELAND—Three upsets occurred during the past week in General Electric's "Refrigerania Sweepstakes," spring sales contest. Perry-Browne, Inc., took the lead in Distributors' Group 2 from The Hines Co., Baltimore; Southern Appliances, Inc., took first place in Group 3 from Electric Household Appliances, Inc., Dallas; and Crescent Electric Supply Co. supplanted Electric Housekeeping, Inc., Omaha, as the leader of Group 10.

Leading distributors in each of the eleven groups were:

Group 1—Matthews Electric Supply Co., Birmingham.

Group 2—Perry-Browne, Inc., Columbia, S. C.

Group 3—Southern Appliances, Inc., New Orleans.

Group 4—General Electric Supply Corp., Portland, Ore.

Group 5—Electric Appliances, Inc., Indianapolis.

Group 6—A. W. Merriam, Inc., Schenectady, N. Y.

Group 7—E. Pulver Cook, Providence, R. I.

Group 8—Rex Cole, Inc., New York City.

Group 9—James & Co., Inc., St. Louis.

Group 10—Crescent Electric Supply Co., Davenport, Iowa.

Group 11—General Electric Supply Corp., Salt Lake City, Utah.

Several distributors have passed 100 per cent of quota, although the campaign still has some time to run. Among these is George Patterson, Inc., St. Petersburg, Fla., who up to the beginning of this week had made 130 per cent of quota, although Matthews Electric Supply Co. still leads

in that group with 1 per cent more in sales to quota.

Perry-Browne, Inc., and Valley Electric Supply, the latter of Fresno, Calif., also have passed their 100 per cent of quota mark, in retail sales.

Competition between wholesale managers remains keen, with Bob Hughes of James & Co., St. Louis, leading in this classification.

Best Retail Performance

Best retail sales performances in the northern distributors' groups were made by Indianapolis, Wheeling, W. Va., and Omaha.

Next week, May 6-11, will be known as "Mike Sweeney Monitor Top Week" in the Refrigerania Sweepstakes campaign with distributors pledging themselves to try to exceed all previous weeks in retail sales of Monitor Tops during that period.

National Sales Manager A. M. Sweeney, whose name has been given to the week's special effort, has set aside personally a prize for the leading retail salesman of each distributorship in the country, the prize going to the man who sells the largest number of Monitor Top refrigerators during the May 6-11 period.

Large Apartment Job

During the past week, the largest apartment house building in Ohio—The Commodore Apartments, Cleveland—was equipped with 181 General Electric X-4's. This sale was reported by Aaron Koser, apartment house division manager of Electrical Housekeeping, Inc., Cleveland distributors.

Carload orders for smaller dealers are increasing, according to A. A. Uhalt, dealer division manager. Among dealers ordering by the carload during

the past few days were H. S. McKeown Spartansburg, N. C.; Payne's Music Store, Greenville, S. C.; Clark Furniture Company, Chester, S. C.; W. W. Howell, Waycross, Ga.

The Gulf States Utilities Co., Beaumont, Tex., is doing an exceptional job in the campaign and already has passed 100 per cent of quota for the entire drive. P. E. McChesney, vice president of the utility company, reported 223 Monitor Top refrigerator sales and 286 Liftop refrigerator sales during the first five weeks of the Refrigerania Sweepstakes drive. L. B. Dugas, at last reports, was the leading retail salesman in the Louisiana territory.

In a special three-day "Steeplechase" activity, Judson C. Burns, Philadelphia distributor, and his retail crew rolled up 112 retail refrigerator sales. Leading in this three-day drive was Dave Eschill's branch organization with 28 orders. During each day, Burns personally visited each of his 10 retail stores.

Burton Issues Challenge

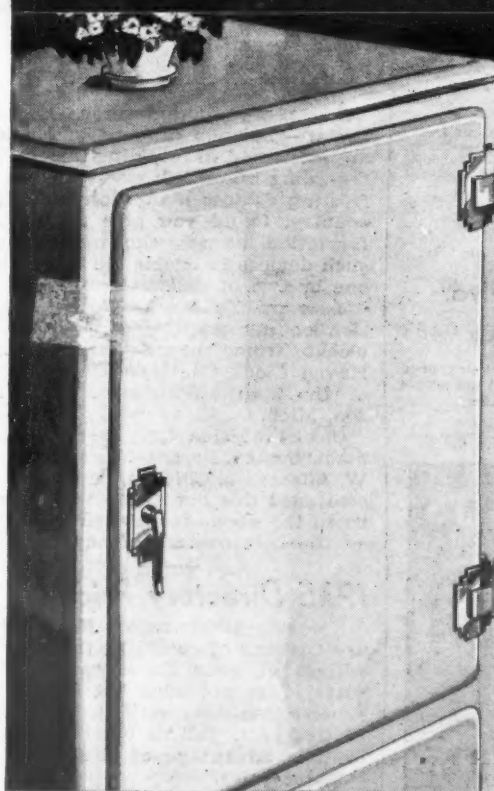
W. L. Burton, retail sales manager for James & Co., St. Louis has become so enthusiastic over their prospects for a new high sales record that he has issued a challenge to J. P. Maloney, of W. L. Thompson, Inc., Boston, that James will beat Thompson on a balanced job (of all home appliances), on retail sales managers' competition, and on other features of the contest.

T. H. Rochford, of Lou Kohlman's commercial division in R. Cooper, Jr., Inc., Chicago distributors, has sold a carload of G-E ice cream cabinets for rush delivery, in addition to a number of other commercial installations. He has more than 150 per cent of his campaign quota.

Frank Vernon, water cooler manager for Rex Cole, Inc., New York, was leading all water cooler managers in sales at last reports.

BONDERIZING

MAKES THE REFRIGERATOR AND AUTOMOBILE FENDER "SISTERS UNDER THE SKIN"



UNDER the finish on more than half of the refrigerators made today is Bonderizing. This is the same rust-preventing finish base that protects the fenders of automobiles from the effects of storm and sunshine and other outdoor hazards.

In the same way, Bonderizing meets the typical corrosion conditions to which refrigerators are exposed. Bonderizing gives the finish greater stability, prevents flaking and checking, and stops the spread of rust from scratch or dent.

Bonderizing is an important factor in finish permanence and continued customer satisfaction. It is an invisible quality that will be appreciated if made known to the buyer, and is a powerful selling point. Be sure to mention this feature if your line is Bonderized. It gives the owner greater all-around confidence in his purchase.

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- Straight Line Rigid Construction.
- Simplicity & Durability.
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LIMA, OHIO

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SPRA-BONDERIZING is accomplished by spraying the production with the processing solution. It reduces processing time, steam, equipment and supervision requirements. Any manufacturer applying paint coatings to steel should investigate this process.

Complete descriptive information will be sent on request.

REFRIGERATION NEWS

Registered U. S. Patent Office

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Service Parts to Be Made & Sold By Borg-Warner

Replacement Parts for All Makes of Refrigerators To Be Marketed

CHICAGO—A complete line of parts and accessories for all makes of refrigeration and air-conditioning units is now being sold by the Borg-Warner Service Parts Co., a division of Borg-Warner Corp., A. C. Darling, vice president and general manager, announced last week.

Borg-Warner Corp. is the parent corporation of Norge Corp.

All parts and accessories for the new lines are now being stocked at the Borg-Warner warehouse, 121 East 21st St., Chicago and are available for rapid delivery to service organizations in Indiana, Illinois, Michigan, Wisconsin, and Iowa.

Borg-Warner Service Parts Co. has for many years been one of the leading sales organizations for automotive replacement parts and maintains warehouses in 13 principal cities throughout the country. The refrigeration and air-conditioning parts and accessories will eventually be warehoused in each of the 13 locations, Mr. Darling said, and will serve the trade on the same nation-wide basis that the automotive parts business is now conducted.

Sears-Roebuck Sells 6-Cu. Ft. 'Special' Coldspot for \$117

CHICAGO—Selling for \$117.50, a new 6-cu. ft. Coldspot model is making its appearance in some of the Sears, Roebuck retail stores throughout the country.

According to Sears, Roebuck officials, this model is being offered to a few stores for promotion during May, and is not being advertised nationally throughout the chain. Detroit is one of the metropolitan centers in which it is being sold. The refrigerator is advertised as a "bargain" in Sears' "May Economy Festival."

In design, this new Coldspot model is similar to the 1935 model 104. It is equipped with a centered evaporator, interior electric light, touch door opener, nine-temperature cold control, finger ice tray release, folding accessory shelf.

It has 6.2 cu. ft. net food storage capacity, and four shelves with a total shelf area of 12.2 sq. ft. Three ice cube trays produce 96 cubes at one freezing.

Exterior finish is Dulux, interior is porcelain. Insulation is 3 in. of Dry-Zero in sides, bottom, and back. Crated weight of the model is 324 lbs.

TVA Appeal Will Be Heard June 16

NEW ORLEANS—The Federal Circuit Court of Appeals here has ordered a hearing in Atlanta on June 17 on the appeal of the Tennessee Valley Authority from the district court decision handed down by Judge E. I. Grubb in Birmingham.

James L. Fly, general solicitor for the TVA, believes that if the case is held on this date, it may be brought before the United States Supreme Court in October for a final ruling.

The Department of Justice is co-operating with the TVA in preparing its appeal. Although it has been the policy for the TVA to handle its own court matters, Attorney General Cummings said in behalf of the Justice Department: "Because this case involves the fundamentals and affects the very life of TVA, we now are cooperating."

LaSalle & Koch to Handle Crosleys in Toledo

TOLEDO—LaSalle & Koch, department store here, is now handling Crosley electric refrigerators, reports James E. Aitken, president, Aitken Radio Co., Crosley distributor for Toledo and Detroit. D. W. Griffin is in charge of the refrigerator sales.

Mr. Aitken states that LaSalle & Koch featured the Crosley refrigerator at the recent Toledo Electric Refrigeration Show.

McNeal Is Elected Universal Cooler President

DETROIT—Following a meeting April 26 of the board of directors, Universal Cooler Corp., Acting Chairman A. H. Sarver announced that Frank S. McNeal, who was appointed general manager on Feb. 9, 1935, had been elected to fill the position of president.

Mr. McNeal's title is now president and general manager of Universal Cooler Corp.

Prior to succeeding the late G. M. Johnston as general manager of Universal Cooler Corp., Mr. McNeal had been vice president of Kelvinator of Canada, Ltd., at London, Ont.

Leonard Distributor Takes on Kelvinator Line in Two Cities

BALTIMORE — Southern Wholesalers, Inc., distributor for Leonard refrigerators and RCA Victor radios here has just been appointed Baltimore and Washington distributor for Kelvinator Corp. The company is the first distributor in the Baltimore territory to distribute two major lines of electric refrigeration.

Former distributors for Kelvinator here were Barber & Ross, Inc., handling the District of Columbia territory, and its Baltimore subsidiary Montgomery Electric Co., Inc., distributor in the Baltimore area.

Edward Brandt, former general sales manager for Barber & Ross, Inc., is now general manager of the Southern Wholesalers' appliance division.

The entire service organization of Barber & Ross has been taken over by Southern Wholesalers, Inc.

Final arrangements for assumption of the Kelvinator distributorship by the wholesale company were made at a meeting held at the Washington headquarters of Southern Wholesalers.

Those attending the meeting included: William O'Connor, president; Francis Ferber, secretary and vice president; Edward W. Ament, manager, Baltimore division; Edward Brandt, new general sales manager; R. I. Petrie, sales manager of Kelvinator Corp.; H. E. Markland, assistant sales manager; and Vernon C. Caulkins, local district manager.

Thompson Tire Chain Will Handle Crosleys

BOSTON—The Thompson Tire Co., Inc., with headquarters in Brockton and operating nine stores in Massachusetts, has been designated an authorized dealer for the complete line of Crosley electric refrigerators and Crosley radios in all its stores, David Rockman, general manager, George Collins Co., Crosley distributor, Boston, reports.

Jackson, Miss. Dealers Conduct Cooperative Operating Tests in Showroom Window

JACKSON, Miss.—In this agrarian state where the ice box is still popular and the electric refrigerator has not received quite the public acceptance as in more populous centers, Jackson Electric Refrigerator Dealers Association recently tried out a new promotion stunt in the form of a test on food preserving and operating cost test conducted in a showroom window.

A seven-day test on seven leading makes of refrigerators was arranged in order to show the low operating cost of electric refrigeration, the fast freezing speed, and the superior food preserving qualities.

The demonstration was in charge of Dr. J. M. Sullivan, dean of the department of science of Millsaps College, and the public was permitted to look on through a show window on the main street. Doors of the boxes were opened every half hour and food was kept in them in order to approximate home conditions as nearly as possible.

Results of the test on the refrigerators was announced in newspaper advertising as follows:

Average kwh. consumption per month per cubic ft.—6.54 kwh.

Average time of freezing—2 hours and 56 minutes.

New Frigidaire Product



Charlotte Kern (left) and Marie Siebert pose with one of Frigidaire's new room-type cabinet conditioners, to demonstrate its compact design. Miss Siebert is turning on the starting switch.

Frigidaire Adds Two New Conditioners

DAYTON—Air-conditioning division of Frigidaire Corp., through J. J. Nance, manager, today introduced two new air-conditioning units—the Frigidaire SC-40 and the Frigidaire SC-80. The smaller unit will retail for \$420, f.o.b. Dayton, the larger one for \$579.

The two additions to Frigidaire's line of equipment for unit or central system installations are self-contained and are equipped with thermostatic controls, facilities for the introduction of outside air, and air filters.

Model SC-40 has approximately three-eighths of a ton refrigeration capacity and the SC-80 approximately three-quarters of a ton.

Both are designed for individual installations, particularly in homes and offices, although they are suitable for many other applications, such as, hotel rooms, hospitals, and retail shops, Mr. Nance said.

Atwater Kent Distributors Will Meet June 3-4

PHILADELPHIA — Atwater Kent distributors from all parts of the country will meet June 3 and 4 at the Ambassador hotel in Atlantic City for the annual Atwater Kent distributors' convention.

Mills Novelty Co. Files Court Action Under Anti-Trust Law

CHICAGO—Following closely in the wake of the Federal Trade Commission complaint against the officers and members of the International Association of Ice Cream Manufacturers, Mills Novelty Co., manufacturer of a counter-type ice cream freezer, filed April 29 in the Federal District Court (Northern District) an action for treble damages under the provisions of the Sherman Anti-Trust and Clayton Acts amounting to \$46,929,995.12.

The action for damages is directed against some 80 defendants, the principal holding companies in the business of manufacturing ice cream, together with their operating subsidiaries.

In its petition the plaintiff alleges that for a period of four years the ice cream holding companies united in a common cause of unfair competition and have cooperated and confederated together in a conspiracy to prevent and discourage the use of the counter ice cream freezers manufactured by Mills Novelty Co.

Among the numerous methods used to carry out the conspiracy, it is alleged, the defendants sponsored and caused to be enacted legislation ostensibly designed to establish standards of sanitation but which was in reality initiated for the purpose of suppressing competition from the sale of these machines.

Other subversive tactics employed by the defendants, the petition charges, include defamation, intimidation, sabotage and insidious, and false propaganda.

It was further pointed out that a market survey made by Mills Novelty Co. revealed that whereas approximately 4,000 counter freezers are now in use the prospective purchasers of the machines are estimated at 160,000. "Obviously," adds the plaintiff's petition, "the stifling of free and unhampered competition by the defendants in their efforts to control the manufacture and distribution of ice cream has made it impossible for the Mills Novelty Co. fully to develop the large potential market for counter freezers."

Counsel for the plaintiff, Mills Novelty Co., is Major Charles R. Pollard of Bank & Pollard, Washington.

G-E Inaugurates Service For Architects, Builders

CLEVELAND—In line with the increased interest in home construction and modernization, a service for architects, consulting engineers, and home builders has been organized as a part of the General Electric Institute under the supervision of C. M. Snyder, manager of the dishwasher division of G-E.

Virginia Power Rents but Won't Sell Chest Units

Utility Plans to Develop Market among Lower Income Classes

By F. M. Cockrell

RICHMOND, Va., May 7—To develop its market among the lower income classes on its power lines, the Virginia Power Co. is renting Westinghouse chest-type electric refrigerators for \$1 per month to customers who use less than 30 kwh. per month, or whose power consumption during the last 12 months has not exceeded 360 kwh.

The utility has obtained a large number of these chest-type units, which it rents to customers in rural districts and small towns in eastern Virginia and North Carolina for a period of nine months. At the end of that time, the refrigerators are removed. Contrary to reports, the company is not selling them to its customers. This utility does no merchandising.

Principal motive back of the plan is to increase interest in and the use of electric refrigeration in the lower income brackets, and thus build the utility's power load in a large potential market.

If a sale is made to a customer using more than this amount of current, the salesman is paid no commission on the transaction.

After the refrigerator has been in use for two months, the utility turns the customer's name over to local dealers as a prospective buyer of an electric refrigerator. In towns where there are only three or four dealers, the customer's name is given to all of them; where there are more dealers, the company allows them to work out their own system for dividing the names of these prospects.

No refrigerators are being sold under this plan in Norfolk, Richmond, or Portsmouth, the larger cities in this area. The utility is pushing the plan in Suffolk, Petersburg, Williamsburg, Fredericksburg, and other small towns, however, with good results, as well as in rural areas throughout the territory which it serves.

In putting the rental plan into effect, Virginia Power Co. has met with considerable opposition from retail merchants' associations, ice companies, and dealers throughout its territory. Dealers at first claimed the rental plan would prove a detriment to sales.

The utility, however, claims that sales of electric refrigerators in the territory are considerably ahead of last year, and that practically every dealer in the territory is doing better business than he did during the same period of 1934.

Sales figures for the first quarter of 1935, the utility says, show that Norfolk is 60 per cent ahead of its 1934 mark; Portsmouth, 34 per cent ahead; and Suffolk, 26 per cent ahead. The rental plan, however, is in effect in only the last-named of these three cities.

Business is good throughout this territory. There are no heavy industries, and this territory is not within the cotton and tobacco areas. People are eyeing the future with a good deal of apprehension, but they are buying refrigerators.

\$225,000 Order Placed By Crosley Distributor

ATLANTA—Herndon Thomas, manager of the electric refrigeration department of Beck & Gregg Hardware Co., Crosley Georgia distributor, placed an order May 1 for \$225,000 worth of Crosley electric refrigerators, representing 25 carloads of 1,500 units for immediate delivery.

The order is said to be the largest ever placed at one time for electric refrigerators in Atlanta, and R. L. Keating, southeastern district manager for Crosley, declares it is one of the largest ever placed by a distributor in the southern states.

The 25 carloads are to fill orders from 150 retail dealers in Georgia served through Beck & Gregg. It reflects an increase of 250 per cent in retail orders for Sheldons in this territory during the first quarter of 1935 as compared with the same period last year, said Mr. Thomas.

A BIG FIELD! A BIG LINE!



A BIG PROFIT OPPORTUNITY FOR YOU WITH COPELAND COMMERCIAL UNITS

COPELAND Commercial Installations are increasing rapidly. With new businesses starting up everywhere, others modernizing, Copeland demand is gaining momentum every month. Board of Health food storage regulations, and rising food prices make commercial refrigeration necessary to business success. Copeland offers aggressive organizations a big line of 24 different commercial models covering every application. With this great line—priced right—you can enter this rapidly expanding field and finish 1935 in the big money. Many Copeland outlets are doing it right now. Wire for particulars!

24 COMMERCIAL MODELS FOR:

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- GROCERY STORES
- DAIRIES
- RESTAURANTS
- SODA FOUNTAINS
- HOTELS
- CLUBS, etc.

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Manufacturers of a Complete line of Household and Commercial Refrigeration
Holden Ave. at Lincoln . . . DETROIT, MICH.

Copeland
DEPENDABLE ELECTRIC REFRIGERATION



ELECTRIC REFRIGERATORS
ELECTRIC RANGES
AIR-CONDITIONING EQUIPMENT

Finance the convenient way —the C. I. T. way

In your own city most likely there is a C. I. T. Local Office awaiting your phone call for Financing Service. It is instantly ready to check your purchaser credits, buy paper, make collections and attend to all burdensome details.

C. I. T. Plans cover approved types of mechanical refrigerators and water-coolers, as well as electric ranges and air-conditioning equipment. Send today for a C. I. T. field-man.



C. I. T. CORPORATION

NEW YORK — CHICAGO — SAN FRANCISCO

Completely Functioning Local Finance Offices in the Principal Cities

A Unit of COMMERCIAL INVESTMENT TRUST CORPORATION—CAPITAL AND SURPLUS OVER \$75,000,000

Sales Idea for the Week

By V. E. Vining, Manager of Department Store Sales, Westinghouse Electric & Mfg. Co.

I have heard that John Wanamaker first informed us: "The customer is always right."

Personally, I am not so sure of it, but I do know it is a good idea to let him think he is right.

Selling is no business for a man or woman who insists on winning an argument.

Every time you win an argument you lose a sale. Check it up.

That doesn't mean we are to avoid discussion of the facts in the case. It really means that a good salesman knows the difference between argument and discussion.

In a discussion the salesman keeps his eye on the ball, swings his prettiest, and takes his "lie" as he finds it. In an argument there is a tendency to lift the shoulder, look up, and blame the results all on luck.

I have found that the argumentative type of salesman—the "I-says-to-him" type—usually talks a good game of selling—and his poor scores are entirely due to luck and the "breaks."

And a mad customer is the sheriff's next o'kin.

Milwaukee Refrigeration Association Already Planning for Fall Food Show

MILWAUKEE — Wisconsin Radio, Refrigeration & Appliance Association of this city, meeting May 1, declared its intention to participate again in the annual Milwaukee Food Show, to be held this year Oct. 21 to 26 in the Milwaukee Auditorium.

President Greusel of the association was authorized by unanimous vote of the board of directors to complete arrangements for such participation.

In making his general comments at the meeting President Greusel de-

clared that weather records showed that Milwaukee experienced a colder April by 12° F. than in many years past, and ascribed this inclement weather as the brake that had held down refrigeration sales.

He emphasized, however, that a survey recently conducted by a dealer indicated that 50 per cent of Milwaukee homes are still without either ice or electric refrigeration.

Mr. Greusel gave complimentary mention to the Westinghouse Electric Supply Co. for its newspaper refrigeration advertising in his remarks.

George F. Kiewert, FHA manager of financial relations for the Wisconsin district, was in charge of a talking motion picture explanation of the Federal Housing program at the May 1 meeting.

A dinner meeting and social affair of the association has been scheduled for May 15 at the St. Francis Social Center. This will probably be the final indoor meeting of the association before next fall, according to officials, golf parties displacing these evening meetings during the summer months.

Registrations at the May 1 meeting follow:

W. D. Baker, G-E Supply Corp.; H. Fredericks, Wesco; Gordon Ische, Ische Bros. Radio Co.; M. G. Hammergren, Wurlitzer Co.; J. M. Heim, Edmund Gram, Inc.; T. J. Holzem, Massachusetts Mutual Life Insurance Co.; L. D. Morgridge and S. C. Greusel, G-E Supply Corp.; J. F. Cini and E. J. Cashman, Gimbel Brothers; N. C. Christopherson, T.M.E.R. & L. Co.; W. H. Roth, V. L. Kelly, and A. Van Antwerpen, Radio Specialty Co.; S. D. Camper, Leonard Refrigerator Co.; E. W. Hendricks, Great Northern Sales Co.; C. Scheder and V. R. Weissbrodt, Schuster's; A. Hass, United Radio Co.; V. H. Maurer, W. C. Kluge, M. J. McCuen, and F. W. Greusel, Maurer-Greusel Co.; L. Michalski and B. S. Wisniewski, B. S. Wisniewski, Inc.; W. F. Seemuth and C. W. John, Real Radio Service, Inc.; W. O. Zervas, Electrical League; Phil Kohnen, Westinghouse; H. E. Rietz, Chas. E. Turnock Co.; L. W. Copeland, United Motors Service; Carl Hayssen, Northwestern Accept. Co.; Oscar Goelzer, Jr., Jones Appliance Co.; J. Birnbaum, West Allis Sporting Goods Co.; H. F. Dehn and J. E. Mackowski, The Electric Co.; Bert Johnson, Westinghouse; Jack Weigle, C. W. Krueger, and W. E. Wegner, K-W Home Appliance; Chet Morris, Wisconsin News; J. P. Forsthoefel, John Pritzlaff Hardware Co.; W. G. Hughes, Acme Radio Supply Corp.; Frank Lingnor, National Union Radio Corp.; C. H. Peiffer, Westinghouse Electric Supply; E. F. Schefft, Schefft's, Inc.; G. F. Kiewert and R. L. Fetherston, Federal Housing Administration; Sam Shapiro, Atlas Radio Stores; W. C. Johnson, RCA Mfg. Co.; Al Taylor, Taylor Electric Co.; Harold Zentner and G. H. Neuenfeldt, Sieg Milwaukee Co.

18 New Crosley Dealers Appointed by Goldstein

PITTSBURGH—Eighteen new Crosley dealers were recently appointed by Harold Goldstein, president of the Anchor Lite Appliance Co., Crosley distributor here.

The newly appointed retailers are: Spear & Co., Frank & Seder, Wurlitzer's, all of Pittsburgh; Hart's, Inc., East End, Pittsburgh; R. E. Kaplan, McKeesport; Haney's, New Castle; Frank Levin, Jeanette; R. E. Canon, Franklin; Millemann Music Co., Ambbridge; Milheim Music Co., Butler; Adelman & Ratowsky, Phillipsburg; Schmitt Battery & Electric Co., Homestead; W. H. Fisher, Verona; Hill & Leresch, Wilkesburg; and Winter Music Co., Altoona.

Patterson, Caswell & Cooper Take Leads In G-E Sweepstakes

CLEVELAND—Latest reports in General Electric's spring sales campaign, known as "Refrigerania Sweepstakes," indicate that the national sales quota will be passed by a good margin, reports Jean DeJen, national campaign director.

This week's compilation of sales reports shows that there were three new upsets in the distributors' races. George Patterson, Inc., Florida distributor, took the lead away from Matthews Electric Supply Co., Birmingham, in Group 1. Caswell, Inc., Detroit, supplanted Electric Appliances, Inc., Indianapolis, as leader of Group 5. R. Cooper, Jr., Inc., Chicago, took the lead away from James & Co., St. Louis, in Group 9. Other leaders remained the same as the previous week. Leaders in the distributing group are:

Group 1—George Patterson, Inc., St. Petersburg, Fla.
Group 2—Perry-Browne, Inc., Columbia, S. C.
Group 3—Southern Appliances, Inc., New Orleans.
Group 4—General Electric Supply Corp., Portland, Ore.
Group 5—Caswell, Inc., Detroit.
Group 6—A. Wayne Merriam, Inc., Schenectady.
Group 7—E. Pulver Cook, Inc., Providence, R. I.
Group 8—Rex Cole, Inc., New York City.
Group 9—R. Cooper, Jr., Inc., Chicago.
Group 10—Crescent Electric Supply Co., Davenport, Iowa.
Group 11—General Electric Supply Corp., Salt Lake City, Utah.

Cole Sells 300 in Two Days

Many retail salesmen are making outstanding sales records. Among those in Rex Cole's territory is Albert E. Perrot of Cole's Fairfield County division, who during the month of April sold 23 individual refrigerators, four washing machines, one ironer, and one cleaner, according to Andrew W. Zoltac, division manager.

Cole staged a two-day retail drive, ending April 30, selling 300 refrigerators in 48 hours.

This week is known as "Mike Sweeney Monitor Top Week" in the Refrigerania Sweepstakes sales contest. As an advance indication as to what might be expected in the way of sales, special orders for 48 carloads of refrigerators were received from southeastern distributors and sales outlets.

This activity was headed up by Ben Allen, district manager for the G-E specialty appliance department in that section. Letters and telegrams, pledging unusual sales activity during the week were received by A. M. Sweeney, manager of the sales division, for whom the week has been named.

Georgia Power Orders 10 Cars

Heading the list of outlets with special carload orders was the Georgia Power Co., which ordered 10 carloads. Outlets in George Patterson's Florida territory, ordered 10 cars. W. D. Alexander, Atlanta distributor, ordered two carloads.

Others ordering one carload each were the following:

Territory of L. W. Driscoll, Inc., Charlotte, N. C.—High Point, N. C.; Morrison-Neese Furniture Co., Greensboro, N. C.; Quinn's, Inc., Rocky Mount, N. C.; Bocoek Stroud Co., Wilmington, N. C.; Tide Water Power Co., Wilmington, N. C.; Tide Water Power Co., Wilmington, N. C. (Liftops); Carolina Power & Light Co., Raleigh, N. C. (Liftops); L. W. Driscoll, Inc., Durham, N. C.

Territory of Tennessee Appliances, Inc., Nashville, Tenn.—Proffitt's Department Store, Maryville; S. H. George & Sons, Knoxville.

Territory of Perry-Browne, Inc., Columbia, S. C.; Payne's for Music, Columbia; Clark Furniture Co., Columbia; Carolina Power & Light Co., Florence (Liftops); Carolina Power & Light Co., Florence; South Carolina Power Co., Columbia; Perry-Browne, Inc., Retail Store, Columbia; Hood-Myers Elec. Co., Columbia.

Territory of W. D. Alexander Co., Atlanta, Ga.—Savannah Electric Co.; Georgia Power & Light Co.

Financial Editor Speaks At Breakfast Meeting Of Cooper Salesmen

CHICAGO—Principal speaker at the breakfast meeting held by R. Cooper Jr., Inc., General Electric distributor for this territory, at the Gramere Hotel April 28, was R. P. Vanderpool, financial editor of the *Chicago Evening American*.

Other speakers at the meeting included: M. S. Swaney, merchandise department of the *Chicago Evening American*; R. Cooper, Jr.; S. Nides, sales promotion manager of R. Cooper Jr., Inc.; and J. S. Duncombe, campaign manager.

EVERYTHING

the prospect wants...in

GENERAL ELECTRIC

refrigerators

Stainless-Steel Super-Freezer, cannot chip or tarnish

World's lowest operating cost

Greatest name in Electricity

All Steel Cabinet

Foot Pedal Door Opener, Sliding Shelves

Sealed mechanism requires no attention, not even oiling

Forced Feed Lubrication

Automatic Interior Lighting

Uses 10% to 50% less current

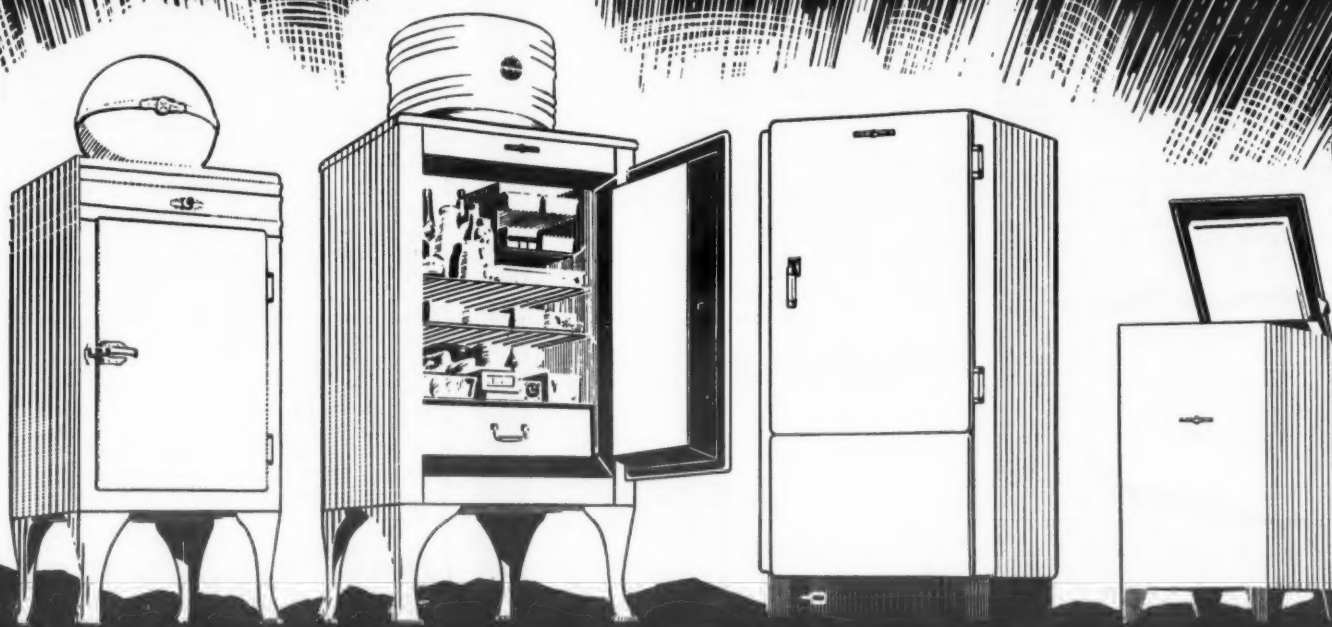
Unequalled Performance year after year

Any type, any size, any price

5 YEARS Performance Protection

Faster Ice Freezing

Modern Styling



LOOK around you in almost any town and you will find it is the GENERAL ELECTRIC dealer who dominates the refrigerator business. He has everything refrigerator buyers want. He concentrates on one line that includes refrigerators of any type, any size, any price. His interest, enthusiasm and sales effort are centered —not divided among several makes of refrigerators. Naturally his stock turnover is greater, averaging as it does, 12 times a year instead of the usual 6 or 7. Eventually you will investigate the General Electric franchise. Write or wire NOW before another season of G-E greater profits slips through your fingers. General Electric Company, Appliance Sales Department, Section DF51, Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC

ALL-STEEL REFRIGERATORS

Training Course in Home Service Given To Boston Salesmen

BOSTON—Featured on the home service program of Mrs. Mabel F. Neal, home service director, W. L. Thompson, Inc., General Electric distributor, is the training school for salesmen of G-E retail and wholesale dealers and utilities.

In her demonstration before the salesmen, Mrs. Neal cooks and serves a dinner, explaining each point of the appliances used as she goes along. She demonstrates the uses of the refrigerator and the range, including an oven dinner and thrift cooker meal. After the meal, the operation of the dishwasher is demonstrated.

Other activities on the home service program are showroom demonstrations, openings of dealer showrooms, special cooking classes combining refrigerator, range, and dishwasher, afternoon teas at a dealer's showroom in which an all-electric kitchen has been installed, and individual demonstrations in the home or showroom on range and dishwasher.

Mrs. Neal has been active in G-E home service work for the last eight years. She has conducted classes in "Cold Cookery" at which she demonstrated the use of the refrigerator and how to make frozen desserts, etc.

If a customer does not know how to operate her range, or, if she thinks her electric bill too high, or for any other reason she isn't satisfied, Mrs. Neal makes an appointment with the customer and points out just what the customer has been doing that is wrong and gives her instructions on the correct and economic usage of the range. Sometimes it involves baking a cake, roasting a piece of meat or even cooking a complete dinner.

'Sleep in Air-Conditioned Comfort'



This picture is submitted to the jury of the industry (readers of Electric Refrigeration News) as a well-nigh perfect example of the restful sleep one can enjoy in an air-conditioned bedroom. The complete relaxation, peace, and comfort of this sleeper should be apparent to the most obtuse of prospects for a room cooler. George Christensen, captain of the Detroit Lions professional football team (voted by sports writers as one of the greatest tackles of all time) is the young man who is so happily lost in the Land of Nod. This candid camera photograph was taken by the editor with the aid of a 40-watt lamp. All rights reserved.

Peirce-Phelps Has Part in 'Progress of Safety' Exposition

PHILADELPHIA — Peirce-Phelps, Inc., Philadelphia distributor for Grunow refrigerators and radios, recently cooperated with Snellenburgs, local department store, in a sales promotion campaign, known as the "Progress of Safety." Grunow electric refrigerators were featured in the display. The Grunow display was made under the direction of Harry Feldman, sales promotion manager.

Other exhibitors were Chrysler Motor Co., Goodyear Tires, DuPont Cellophane, Chase & Sanborn, Sunshine Biscuit Co., The French Line, Franklin Institute, Jacob's Aircraft Engine Co., United Air Lines, Transcontinental Air Line, and the Walz Corp.

The opening evening performance of the Progress of Safety show was held in the auditorium, known as the Grunow Theater. Blanks distributed to those attending entitled them to participate in the drawing for a Grunow electric refrigerator. A prize was also given for the best answer to "Why I think Grunow refrigerators are best."

Cooking schools were held daily in the auditorium under the auspices of various home economists. One of the lecturers was Madame Pearl Violette Metzelthn, nutrition expert at present employed by the Sunshine Biscuit Co. as experimental economist in charge of making and packaging new products and recipes. Prizes were given at the cooking school daily.

Means used to attract attention to the show included the use of a 10,000 candle power search light focused on the front of the building, broadcasting over station WDAS, and a balloon flown over the Snellenburg store with a banner inviting observers to visit the show.

The Peirce-Phelps company will be presented with a cup for having performed an outstanding sales promotion job. Presentation will be made by William Grunow.

H. C. Bonfig, vice president and sales manager of General Household Utilities Co. and J. J. Davin, sales promotion manager of the company attended the exhibit.

Electromaster Issues Catalog & Manual

DETROIT—A new catalog recently issued by Electromaster, Inc. of this city features products of the company, a parts price list for Waldorf electric ranges, Series K, and a service manual for the same series.

The first page deals with construction features of the Waldorf line of ranges. The next six pages show specifications, brief descriptions and illustrations of ranges.

One page is devoted to specifications, description and color photograph of the Electromaster water heater (all sizes). Construction features, description and illustration of the Electromaster cooker appear on the next two pages.

Choose ANSUL REFRIGERANTS

Be sure of high quality

SULPHUR DIOXIDE

A product that has set a standard of comparison for years. Pure and bone dry with every cylinder analyzed to assure highest quality.

METHYL CHLORIDE

Low moisture and acid content guaranteed by analysis of every cylinder. It is fast freezing, stable and non-corrosive.

ANSUL CHEMICAL CO.
MARINETTE - WISCONSIN

STEWART-WARNER SAFETY-ZONE REFRIGERATION IS ROLLING UP PROFIT AND PERFORMANCE RECORDS EVERYWHERE!

*NEW YORK

I have sold some eighty Stewart-Warner boxes and my experience in merchandising this refrigerator, as well as the fact that my service costs have been nothing to speak of, has influenced me to carry this line exclusively.

*TEXAS

During our entire refrigeration experience in the sale of more than eleven hundred electric refrigerators, we have never found as economical, trouble-free job as the Stewart-Warner.

*CALIFORNIA

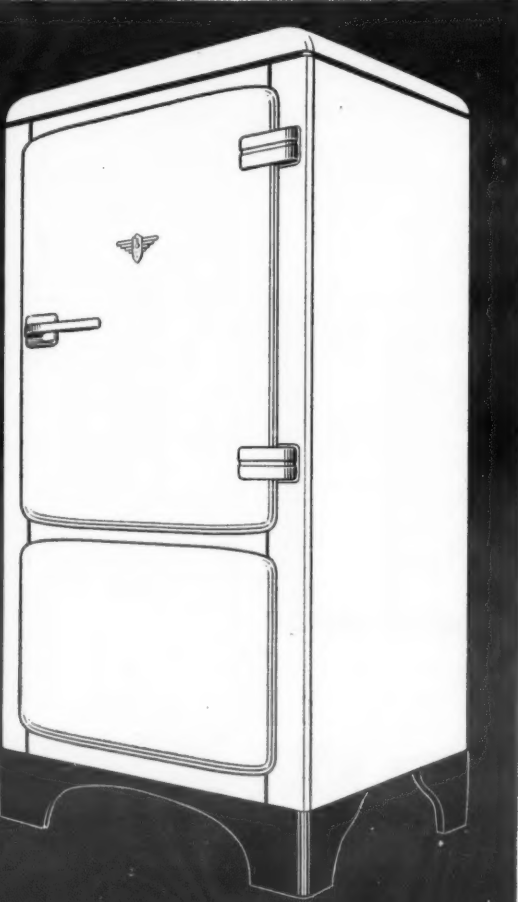
-- expect to feature Stewart-Warner as our leader. Experience shows a very low service cost for the past two seasons. Service calls per unit are far below any other refrigerator line we have handled.

*MISSOURI

Our organization sold about 400 Stewart-Warner Refrigerators and our service department informs me that we have no record of any complaints from customers -- a remarkable record --

*NORTH CAROLINA

The Stewart-Warner Refrigerators we have sold have required no service, while some other lines have just about taken all the profit during the free-service period. We get nothing but compliments on the Stewart-Warner.



WITH the bulk of the season's refrigeration sales still to be made—now is the time to make sure of the big profits of another great Stewart-Warner year. By getting in touch with your distributor immediately, you can quickly make arrangements to sell Stewart-Warner Safety-Zone Refrigeration and keep your profits instead of feeding them back in servicing costs—cash in on proven dependability.

The matchless Slo-cycle mechanism that has caused dealers everywhere to call Stewart-Warner Electric Refrigerators "the line without a service problem" will make your retail profits NET. And your distributor has a dealer plan you'll like. Phone, wire or write him now, or communicate with us direct.

STEWART-WARNER CORPORATION
1841 Diversey Parkway Chicago, Illinois

STEWART-WARNER
New-Type ELECTRIC REFRIGERATOR
*NAMES ON REQUEST

12,000 Attend Show of South Jersey Dealers At Camden Utility

CAMDEN, N. J.—More than 12,000 persons attended the electrical refrigeration show sponsored by the Electrical League of South Jersey, and 261 refrigerator sales were made during the exhibition which was held April 3 to 6 in the showrooms of the Public Service Electric Gas Co. here. This was the eighth electric refrigeration show sponsored by this organization. Both spring and fall shows were held in 1931-32-33. A complete electrical merchandising show replaced the 1934 fall show.

Dealers reported that the average sale price was larger than last year, and that the down payment was greater.

Ward Wilson of the National Broadcasting Co. was featured in entertainment programs during the show. This enabled the show committee to obtain extensive newspaper publicity.

As a promotion feature, a contest was held during the show in which all those who purchased refrigerators were allowed to participate. Entrants wrote, in 25 word summations, their reasons for buying an electrical refrigerator. Prizes awarded were cash payments on the purchase price of a refrigerator.

Refrigerators exhibited were: Westinghouse, Crosley, Grunow, Kelvinator, Atwater Kent, Leonard, Stewart-Warner, Coldspot, General Electric, Gibson, Frigidaire, and Norge.

H. K. Suckling was director of the show.

Utility Salesmen Build Display Kitchen for \$19

WEST FRANKFORT, Ill.—That a display kitchen may be constructed without great expenditure was demonstrated recently when members of the sales organization of the Central Illinois Public Service Co. built an attractive electric kitchen at a total cost of \$19.85 for lumber and building materials, electric supplies, curtains, and painting.

A G-E Monitor Top refrigerator, range, and a number of small appliances are displayed in the kitchen. According to Wesley Henley, district representative with James & Co., St. Louis distributor, the kitchen has been directly responsible for a number of sales.

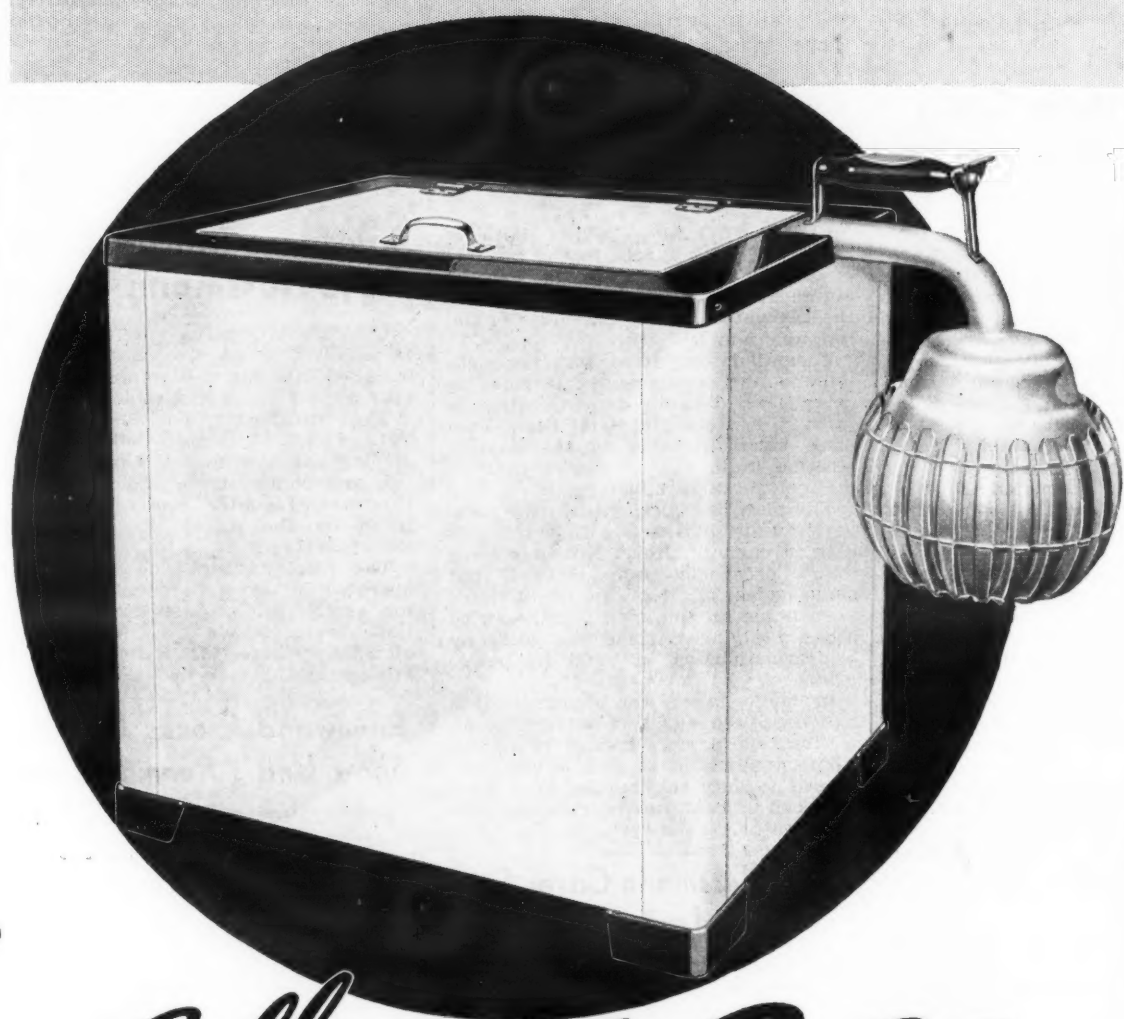
Elkhart, Ind., Dealer Remodels Store

ELKHART, Ind.—Vernon M. Ball, recently appointed G-E dealer here, had his store entirely remodeled and redecorated to provide a proper setting for G-E products when he took over the line recently.

A complete G-E kitchen, placed so that it may be seen from the street, is one of the outstanding features of the store. Each of the major appliances contained in the complete G-E line are displayed in the store.

MILLIONS OF UNWIRED HOMES NEED FOOD-SAVING REFRIGERATION TOO

For them... THE NEW **CROSLEY** **ICYBALL** REFRIGERATOR



ENORMOUS MARKET INCLUDES...

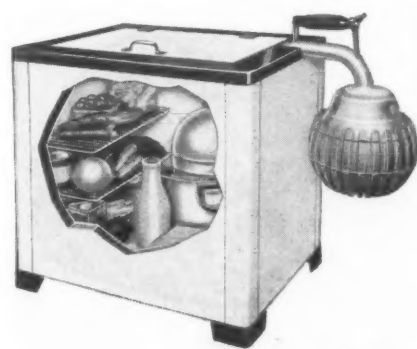
*Rural Homes • Dairies •
Summer Camps • Road-
side Stands • Boats*

ANY PLACE WITHOUT ELECTRICITY

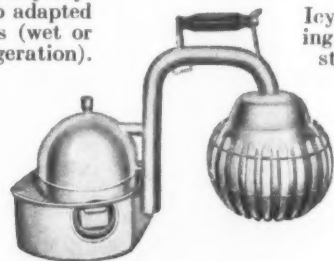
**Most everybody can afford it...
It saves more than it costs**

*Sells
for only* **59 95**
F. O. B.
FACTORY

PRICE INCLUDES CABINET, STOVE,
ICYBALL UNIT, STABILIZER and TUB



Plenty food space
in the Crosley Icy-
ball. Also adapted
for bottles (wet or
dry refrigeration).



Icyball freez-
ing unit and
stabilizer.

ICE FROM HEAT



This for one to
1½ hours daily
—and the Icy-
ball gives re-
frigeration an
entire day
for only
2 cents.

Quality all the way through. Trouble-free oper-
ation. Complete silence. Unbelievable econ-
omy. Gross capacity 4.3 cu. ft. NET capacity
3.5 cu. ft. Freezing tray makes 14 ice cubes.
Gleaming white lacquer exterior, black-trimmed.
Thoroughly insulated. Rubber gasket under
lid. Outside dimensions: 28½" high (including
hardware), 41½" wide (including ball), 24½"
deep. Inside dimensions: 19½" high, 23¼"
wide, 17" deep.

Beyond reach of electric power lines . . . but within *your* reach, this enormous market for the new Crosley Icyball. A dependable, practical, amazingly economical (uses 2c worth of kerosene daily), refrigerator. As great a food-saver as any refrigerator made.

What a boon to rural homes, dairies (equipped with drain for wet refrigeration), roadside stands, boats. And the price means quick sales in any language. No wonder we repeat—an enormous market awaits the Icyball. One in which there is no effective competition. A responsive, willing, dependable market . . . as wide as the country beyond your city limits.

As Crosley has given dealers local leadership with the Crosley line of radio receivers and the celebrated Shelvador Electric Refrigerator, so Crosley now gives you leadership in another field with a product that stands alone—in design as well as value. You cannot afford not to handle Crosley.

THE CROSLEY RADIO CORPORATION - CINCINNATI

(Pioneer Manufacturers of Radio Receiving Sets)

POWEL CROSLEY, Jr., President

Home of WLW—the world's most powerful broadcasting station

COMMERCIAL REFRIGERATION

8 Refrigerators on New French Ship

NEW YORK CITY—The *Normandie*, largest ship afloat and new flagship of the French Line which arrives in New York on her maiden voyage from France on June 3, has a refrigeration system which includes eight specially built electric refrigerators, with a total area of 7,218 sq. ft., ample for handling supplies needed by 2,000 passengers and approximately 1,300 crew members.

Meat, vegetables, fish, fowl, butter, cheese, eggs, lemons, beer, etc., have separate compartments. One compartment has a temperature regulation which permits ripening of fruits. Canned foods are kept in a separate section.

The ship is said to have the world's largest floating wine cellar, equipped to handle 21,000 bottles of liquor and 9,000 bottles of mineral water.

The main kitchen on *The Normandie* is located on the "E" deck and occupies a space of 107 ft. by 195 ft. It has an electric range 55 ft. 3 in. long, carrying 17 hot plates, 32 ovens, and 16 steam ovens. The water supply is piped from the ceiling through 12 curved extensions. A suction ventilator eliminates the steam.

In the pastry and confectionery kitchens are two electric ranges and a large refrigerated table. The vegetable room contains hot and cold water washing machines.

Trans-Pacific Airways' Stopover Island Is Equipped by Hill

TRENTON, N. J. — Refrigeration facilities installed on one of the stopover islands on the chain of trans-Pacific fueling stations for the Pan-American Airways included a large three-compartment cooler and fish case, refrigeration machinery and some kitchen equipment.

Order for the installation was secured by Bill Walker of Schorers at Hartford, distributor for C. V. Hill & Co., Inc., manufacturer of refrigerators and market fixtures.

The coolers were lined with galvanized iron, inside and outside, to withstand attack by tropical insects. Aluminum foil insulation was used in these coolers to combine light weight, minimum wall thickness, and immunity against moisture absorption. Insulation was installed in layers of sheets, eight layers, occupying a space 4 inches thick.

Forrest Will Distribute McCrays in Jackson

JACKSON, Mich.—R. S. Forrest of this city was recently appointed distributor for McCray equipment, reports R. S. Moses of McCray Refrigerator Sales Corp.

Tampa Modernizes Dairy Display



In this dairy display at the Tampa Fair a Larkin Humi-Temp cooling unit (top center of the picture) was employed to provide even, effective temperatures for all parts of the huge glass-enclosed refrigerator.

New System Cools Dairy Display

TAMPA, Fla.—Mechanical refrigeration had an important part in the formation of an unusual dairy display at the annual Tampa Fair here early this year, at which all branches of Florida industry were represented.

The display, one of the largest at the fair, comprised, in addition to Tampa's Poinsettia Dairy, an exhibit of dairy products from various counties in the western part of the state. The case housing the exhibits measured 12 ft. x 9 ft. x 60 ft.

In the section occupied by the Poinsettia Dairy display were two life-size cows and a 5-ft. milk bottle, all carved out of butter. To cool this case, the fair committee last year installed a 7½-hp. compressor, utilizing iron pipe coils.

This year, however, the display case was changed by the addition of two Larkin No. 94 Humi-Temp units and a 3½-hp. Ice-O-Matic compressor, and a temperature of 46° F. was maintained in the case throughout the exposition.

Installation of the equipment was made by the I. W. Phillips Co. of Tampa, distributor of both Larkin and Ice-O-Matic equipment. The Humi-Temps were obtained from Atlanta branch of Larkin Refrigerating Corp.

410-Gal. Truck Fitted With Kold-Hold Units

LOS GATOS, Calif.—Refrigeration for the 410-gal. ice cream truck, operated by the Independent Creamery & Ice Cream Co. here, is supplied by three Kold-Hold units which are cooled at night by operating the Frigidaire 1-hp. compressor installed in the rear.

Insulation consists of 6 in. of Dry Zero in walls and roof and 6 in. of cork in the floor. The insulated empty can compartment holds 70 gallons, making a capacity of 480 gallons in all.

Body of the truck was built by the Batavia Body Co., Batavia, Ill.

McCray Case Keeps Wax Paper Cool in Bakery

CLEVELAND—J. N. Bolton, branch manager of the Cleveland branch of McCray Refrigerator Sales Corp., recently sold a McCray Model 96 refrigerator to a baking company for use strictly as a storage box for waxed paper. The paper is used for wrapping bread and is easier handled and less apt to mold or stick together when under refrigeration.

Gloekler Designs Special Case for Barbecues

PITTSBURGH—Gloekler Mfg. Co. is introducing a new refrigerator designed especially for barbecues and lunchrooms which will sell for less than \$400 complete with condensing unit. It has a net food storage capacity of 25.3 cu. ft. and a shelf area of 28 sq. ft.

Fulton Opens Display Room For McCray at Ottumwa

OTTUMWA, Iowa—Chester Fulton, McCray distributor at Fairfield, Iowa, recently opened an office and display room here, according to R. S. Moses, district sales manager in this territory for McCray Refrigerator Sales Corp. Associated with Mr. Fulton is his son, Lyle Fulton, who represents the Toledo Scale Co.

Induced Draft Used To Cool Water in New Binks Tower

CHICAGO—Binks Mfg. Co. is introducing a new line of induced draft cooling towers with a cooling capacity ranging from 5 to 200 gals. per minute.

The new type towers are for use by refrigeration plants having from one to 50 tons refrigeration capacity or industrial plants using Diesel engines and other internal combustion engines that need jacket water cooling for effective operation.

Water distribution in the new induced draft towers is secured through standard Binks low-pressure "Roto-jet" nozzles. The nozzles spray a fine mist of water downward through upward currents of air induced by the fan assemblies placed at the top of the tower.

During cool weather, where towers are required for year-round operation, the fans may be shut off and cooling capacity secured without their use.

Depending upon tower size and capacity, one or more fans, driven by individual splash and weather-proof motors at speeds of approximately 450 r.p.m., are used.

All towers of the type "K" series are constructed of heavy steel frame surrounded by a sectional copper-bearing galvanized steel housing, asphalted and aluminum painted inside and out.

Arkansas Grocery Store Buys Hussmann Cases

LITTLE ROCK, Ark.—The H. D. Hemphill Grocery Co. here recently installed Hussmann-Ligonier refrigerator display cases and cooler.

The installation consists of two T512 12 ft. "Humid-I-Coiled" meat display cases, a model TF506 six ft. fish and poultry case, and an HCP86 Hussmann-Ligonier cooler, manufactured by the Allied Store Utilities Co. of St. Louis.

The display cases and cooler are operated in connection with Kelvinator refrigeration. Sale and installation were made by 555, Inc., distributor here for Kelvinator and Hussmann-Ligonier products.

Pennwood Clocks Used to Show Unit's Running Time

PITTSBURGH — Pennwood Co. of this city has just issued a new catalog describing and illustrating its self-starting electric clocks, two of which have been used by the Westinghouse Electric & Mfg. Co. to demonstrate the effectiveness of insulation in its refrigerators.

The clocks were placed on top of the refrigerators, one to measure the time the unit was in operation and the other to measure its "off" time.

These clocks, the catalog points out, may be inset in refrigerators, ranges, radios, etc. as an added sales feature.

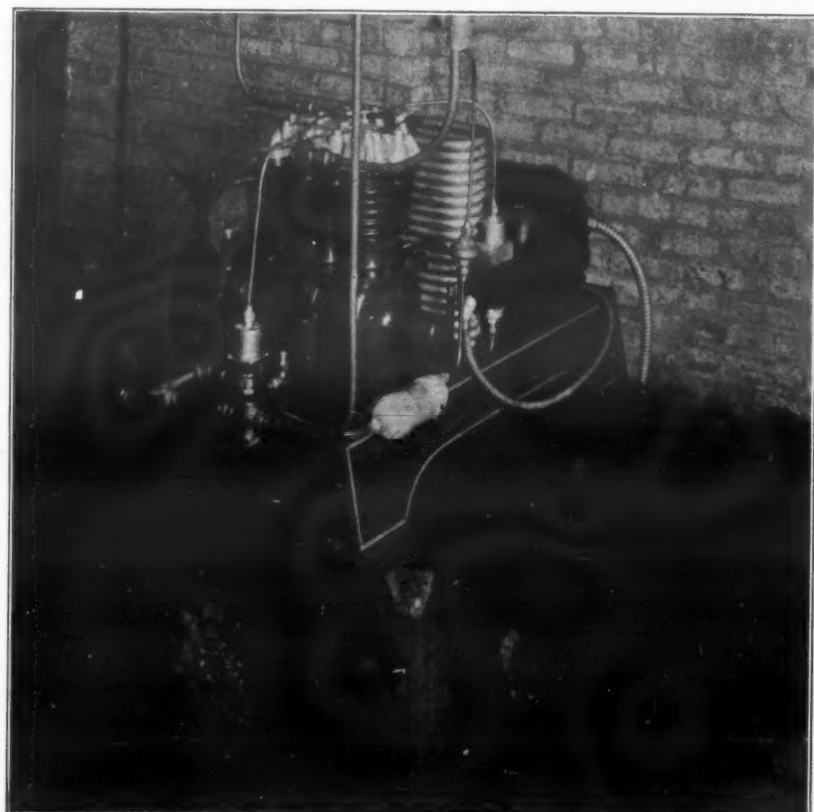
Each clock is equipped with a self-starting motor. All moving parts are enclosed with a permanent supply of lubricant. The three drums and motor are supported by a one-piece metal chassis.

Three Hussmann Cases Sold To St. Louis Market

ST. LOUIS—The Jim Remley Market, operating a number of retail food stores here, has remodeled its store at 5015 Gravois, and has installed three model T516 16-ft. Hussmann-Ligonier refrigerator display cases, three model DX516 16-ft. cases, and one Model DX512 12-ft. case.

The refrigerator display equipment is operated in connection with a 2-hp. and a 1-hp. compressor, while the individual compartments of the large storage cooler are cooled by a 1-hp. and a 1½-hp. York Freon compressor.

Handles Entire Meat Market System



This new 1½-hp. water-cooled Brunner condensing unit is used to refrigerate 16 ft. of top display case and a 10x8x10-ft. walk-in cooler at the Peter Micheloni market, 1734 E. 79th St., Chicago. Installation was made by the Handley Refrigeration, Inc.

WEBER

Refrigerator Cases

THIS IS A MOST INTERESTING CASE!



You can profit by representing in your territory a firm whose products are free from service troubles.

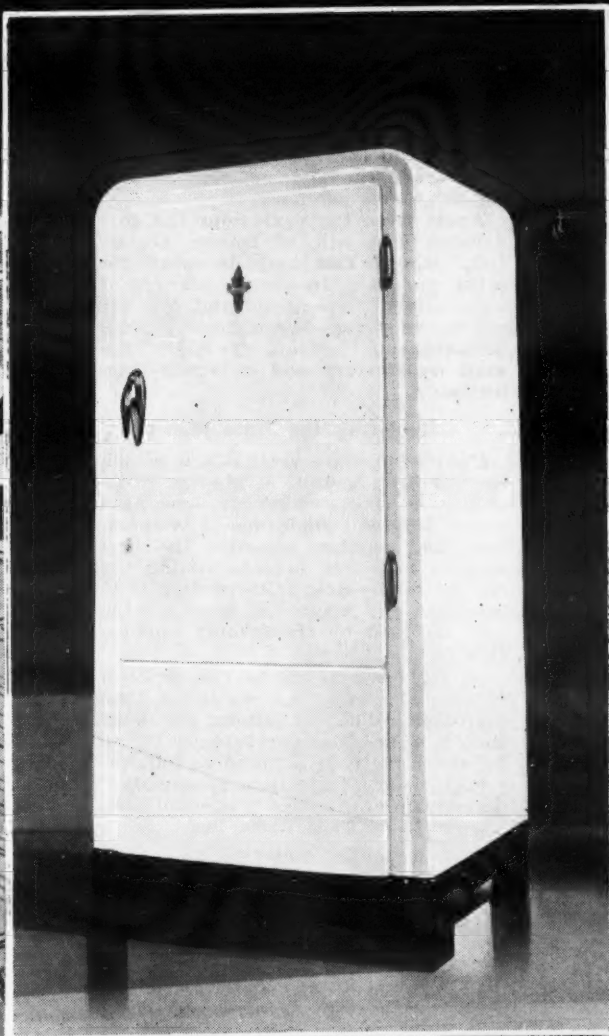
Two year guarantee against fogging and other fool-proof features just as important.

Write today for the "Weber Distributor Plan."

WEBER SHOWCASE & FIXTURE CO., Inc.
5700 AVALON BOULEVARD
LOS ANGELES, CALIFORNIA

A vast new market

FOR THE SALE OF REFRIGERATORS BEYOND THE GAS MAINS



Now open

WITH THE *kerosene*

ELECTROLUX

BEYOND the gas mains and power lines, there's a huge, practically untapped market for this ideal refrigerator for rural and farm homes, summer inns and camps. This market requires no pioneering or educational work. The families who comprise it know the benefits of modern refrigeration. They want these benefits. And now, the Kerosene Electrolux makes it possible for every family to have them no matter where they live.

Made by the makers of the nationally known Electrolux Gas Refrigerator, this

modern kerosene refrigerator offers the same outstanding advantages that have made Electrolux the choice for fine homes and apartments from coast to coast. It's economical to operate . . . permanently silent . . . has no moving parts to wear . . . and is equipped with all those worthwhile modern conveniences that mean so much to women. The Kerosene Electrolux line consists of four beautiful models.

Kerosene Electrolux is being backed by the greatest national advertising campaign in Electrolux history. General magazines

and farm papers are carrying its story into more than 5,000,000 farm and rural homes this year.

A few franchises for the Kerosene Electrolux are still available for dealers who can present satisfactory credentials. If you believe that you are such a dealer, write for information to Servel, Inc., Electrolux Refrigerator Sales Division, Evansville, Ind.

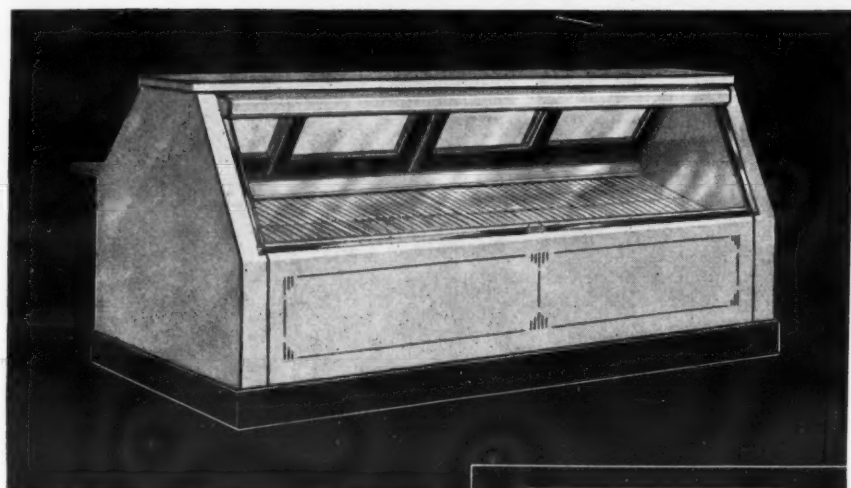
SERVEL, INC.
Electrolux Refrigerator Sales Division, Evansville, Ind.

I am interested in securing complete details about the Kerosene Electrolux franchise.

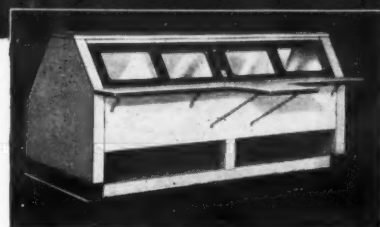
NAME.....
COMPANY NAME.....
ADDRESS.....
TOWN.....COUNTY.....STATE.....
TYPE OF BUSINESS.....

SERVEL, INC., ELECTROLUX REFRIGERATOR SALES DIVISION, EVANSVILLE, IND.

The BUTCHERS' SPECIAL TOP COUNTER in The PUFFER HUBBARD Line



PUFFER-HUBBARD BUTCHERS' SPECIAL TOP COUNTER. AVAILABLE IN STANDARD 6, 8, 10 AND 12 FOOT LENGTHS



YOU'LL find a ready market for the Butchers' Special Top

Counter — another of the attractive display cases in the Puffer-Hubbard Line. These cases are sold only through accredited refrigeration distributors and dealers, under franchise. There's extra profit in a "package job". Sell Puffer-Hubbard commercial cases along with your compressor. They're built right, styled right, and priced right.

PUFFER-HUBBARD MFG. CO.
MINNEAPOLIS MINNESOTA

BEER COOLING

Wyllie Explains How to Select Compressors for Beer Cooling

By John Wyllie, Jr., Sales Manager, Temprite Products Corp.

THE point which must always be borne in mind in the selecting of condensing units for the operation of Temprite coolers is that Temprite is an instantaneous cooler and imposes a load on the condensing unit at the rate at which the water or beverage is being cooled. The condensing unit must, therefore, have sufficient hourly capacity to meet the peak load imposed on

the cooler. For example, supposing it is required to cool 300 gallons of water from 80° to 50° over a 10-hour period but that during one of these hours the consumption of water is at the rate of 60 gallons per hour.

Both the cooling unit and the condensing units must, therefore, have a capacity sufficient to cool 60 gallons per hour in this case and not simply an average capacity sufficient to care for 30 gallons per hour.

Apart from the peak hour the condensing unit will, of course, not be fully loaded and may be used for other purposes. In some instances of unusually high peak demand, the use of reserve storage in combination with instantaneous cooling provides the most satisfactory and economical solution.

Calculating the B.t.u. Load

Unless tables are available in which the condensing unit is rated as to its ability to cool water or beverages under different conditions of temperature and suction pressure the first step to be taken in determining the size of condensing unit required is to calculate the maximum hourly B.t.u. load imposed by the cooling application.

If, for example, as in the problem mentioned above, the maximum load is found to be 60 gallons per hour cooled from a temperature of 80° to 50° the B.t.u. load is found as follows:

B.t.u. load = Quantity in pounds × temperature difference × specific heat.
Quantity = 60 × 8 1/2 = 500 lbs.

Specific heat of water = 1
Temperature difference = 80 - 50 = 30°

B.t.u. load = 500 × 30 × 1 = 15,000 B.t.u. per hour.

The condensing unit required for operating the Temprite is, therefore, one which has an hourly B.t.u. capacity of 15,000. Remember, however, that the condensing unit need not have this capacity at the low suction pressures ordinarily required for the operation of other types of cooling units but only at the high suction pressure at which Temprite is able to operate.

A reference to condensing unit capacity tables at various suction pressures will indicate the significance of this point.

Operating Suction Pressures

To obtain the greatest economy and capacity from a condensing unit it should be selected for and operated at the highest possible suction pressure.

The actual suction pressure depends, of course, on the desired exit temperature, but whatever this may be, Temprite units will give their full rated capacities when operated with refrigerant temperatures of only 4° below the exit beverage temperature.

If, as in the example the outlet temperature desired is 50° the refrigerant temperature in the cooler will be 46° and the suction pressure in the crankcase of the compressor will be the vapor pressure corresponding to 46° for the refrigerant in question minus a suitable allowance for pressure drop in the suction line.

In a properly installed system this pressure drop will not usually exceed 2 lbs. As an example, consider the case of a system employing SO₂ and used to cool water to 50°:

Exit water temperature—50°
Refrigerant temperature in cooler—46°
Pressure corresponding to 46°—15 lbs.

Allowance for suction line drop—2 lbs.

Compressor operating suction pressure—13 lbs.

Compressor capacity should be selected at this suction pressure.

Beer Cooling

The foregoing discussion illustrates the manner in which the B.t.u. load may be determined for any cooling problem in which the rate of cooling can be established.

Ordinarily this can be done quite easily in a water cooling installation but not always so readily in the case of beer cooling, because in beer cooling the peak loads have little relation to the amount of beer actually sold and cooled per day.

These are fixed almost entirely by the range of temperature through which the beer must be cooled, the number of bartenders dispensing the beer and the size of glass into which it is drawn.

Generally speaking, regardless of the number of draft stations which he may service, one bartender, when serving beer in 12-ounce or small glasses and at the same time making change and taking care of the other duties of the bar, cannot serve more than 20 gallons of beer per hour. This, therefore, establishes the rate of cooling per bartender in cases of this kind.

When beer is being served in pitchers for table service or in steins of larger than 12-ounce capacity, the rate of draft, of course, increases because of the greater percentage of time which the draft faucet is open and will reach a rate of about 60 gallons per hour per bartender as a maximum.

In any case the maximum hourly B.t.u. load on the condensing unit is determined by multiplying the number of bartenders by the maximum rate of draft in gallons per hour as established above, then by 8.5 to convert to pounds and then by the difference in temperature between the beer in the keg and the desired exit temperature.

It will be noted that the number of coolers or taps does not enter into the problem nor the number of brands of beer which may be on tap. (Note: Unless it is definitely known that the temperature of the beer in the keg is higher than 55°—this keg temperature is ordinarily used.)

Having determined the B.t.u. load, select the condensing unit as outlined

in the early portion of the instructions.

Multiple Installations

In the usual beer cooling installation the condensing unit operating the Temprite cooler is also used to operate the other cooling units comprising the complete installation. In fact Temprite cooling units lend themselves particularly to multiple installations of this nature because Temprite coolers require refrigeration only when beer is being drawn through them.

When, however, the Temprite unit does require refrigeration it is capable, because of the high suction pressure at which it operates, of absorbing, if necessary, the entire capacity of the condensing unit, thus insuring at all times the proper cooling of the beer.

Compressor recommendations for multiple installations are computed as follows:

1. Determine the hourly B.t.u. peak load imposed by the beer coolers as already instructed.

2. Select a condensing unit with sufficient hourly capacity to meet this load, keeping in mind that the Temprite itself must operate at the following suction pressures to produce 40° exit beer.

Refrigerant	Pressure
SO ₂	8.6
CH ₃ Cl	24.4
Freon	31.4

Note: Allow for a reasonable pressure drop in the suction line when making this selection.

3. Calculate the total daily beer cooling load which is the maximum number of 1/2 barrels used daily, multiplied by 136 to convert to pounds and by the temperature difference between the keg and the desired exit temperature. This converts the total daily beer cooling load to B.t.u.

4. Divide the value obtained in step 3 by the hourly B.t.u. capacity of the condensing unit as found from step 2. This establishes the number of hours which the condensing unit must operate per day to handle the Temprite beer cooling load. Add to this an additional 1 hour to provide for the heat leakage at the draft station fixture and subtract this total from the number of hours which the condensing unit manufacturer recommends that his machine be permitted to operate per day.

This leaves the number of operating hours available for handling the other cooling units which are connected in multiple with the Temprite. These remaining allowable hours of running time are normally spread uniformly over the entire 24-hour period.

5. Multiply the hourly capacity of the condensing unit at the lowest operating suction pressure required by the other cooling units, by the number of hours available from step 4. This gives the daily B.t.u. capacity available for the operation of the other cooling units and in most instances it will be found to be sufficient for the operation of these units. If not the condensing unit size is increased to the point where sufficient additional capacity is provided to meet the requirements of the other units.

A. Switch Setting—The compressor must be operated from a pressure control, the cut-in point of which should be as low or lower than the setting of the Temprite control valve (see tag attached to control for this setting). The switch may be set to cut out at any pressure below this point depending upon the requirements of the other cooling units.

B. High Suction Pressure Condensing Units—High suction pressure condensing units are always recommended for use with Temprite cooling units. Low suction pressure condensing units may, however, be used provided that they have sufficient capacity at the low suction pressure recommended for their operation to handle the hourly B.t.u. load established by the Temprite units.

C. Temperature Regulation—Each Temprite cooler is equipped with its own control valve and will maintain uniform exit temperatures within its capacity without the use of additional control devices, provided the proper cut-in point is maintained as explained in Point A.

The temperature of the coldest evaporator on the multiple system can be controlled directly by the cut-out setting of the switch. Other evaporators with intermediate temperatures should be equipped with a pressure control valve such as model 700.

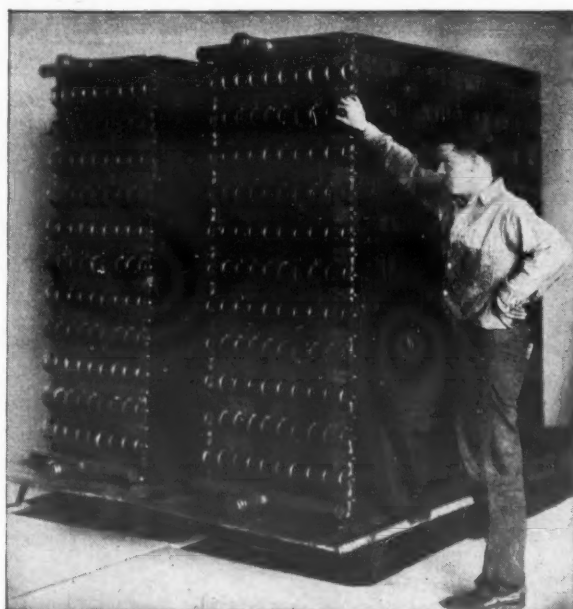
Temprite Capacities

As has already been mentioned, Temprite cooling units are designed to give their full rated capacities and to perform in the proper manner when the refrigerant within the cooler is maintained at a temperature of 4° below the desired exit water temperature. It is the setting of the Temprite control valve which regulates the refrigerant temperature.

A differential of greater than 4° is not necessary and should not be used. Thus when a Temprite is required to deliver water or beverage at a temperature of 50°, the control valve should be set to maintain a refrigerant temperature of 46°. For 45° water, the refrigerant should be maintained at 41°, and 40° exit temperature the control valve should be set to maintain the refrigerant at 36°.

BUSH INDIVIDUAL FIN CONSTRUCTION MAKES IT POSSIBLE FOR YOU TO ORDER COILS WITH THE PROPER SURFACE AND DIMENSIONS FOR EACH INSTALLATION.

THE COILS ON THE RIGHT HAVE 3000 SQ. FT. OF SURFACE AND THE COIL SHOWN BELOW IS SMALL IN COMPARISON WITH BUT 80 SQ. FT. OF SURFACE.



TOO LITTLE SURFACE REDUCES COMPRESSOR EFFICIENCY AND TOO MUCH SURFACE SERVES NO USEFUL PURPOSE. WITH BUSH CONSTRUCTION IT IS NOT NECESSARY TO GO TO EITHER EXTREME AND THE USE OF BUSH COILS WILL ASSIST YOU TO MAKE BETTER AND MORE PROFITABLE INSTALLATIONS.

COMPLETE INFORMATION ON REQUEST



THE
BUSH
MANUFACTURING CO.
HARTFORD, CONN.

489 FIFTH AVE. NEW YORK
6432 CASS AVE. DETROIT
610 N. OAKLEY BLVD. . . . CHICAGO

COMMERCIAL REFRIGERATION

Plan for Getting Commercial Jobs Outlined in Sales Drive by Utility Management Corp.

NEW YORK CITY—Special emphasis is being placed on commercial refrigeration during the latter part of the load building campaign now being conducted by the Utility Management Corp. throughout its various power properties.

The utility system feels that there is a big sales opportunity for commercial refrigeration because of the following reasons:

Business in general is on the up-grade.

Farm income is up.

Business failures are lowest in 12 years.

Prices have increased.

Out-of-date equipment will be replaced.

Electric current costs have been reduced.

Public more refrigeration-conscious in 1935.

Government aid.

Many business men believe officials of the utility, do not know they can finance their purchase of commercial equipment with the aid of the government.

FHA Loans Available

Under the National Housing Act, any property owner, individual, partnership or corporation with a regular income from an assured source, may borrow from \$100 to \$2,000 for improvement purposes. No minimum down payment is required from the borrower and the loan may run from one to three years and the approximate cost \$5 per \$100 per year.

The Utility Management Corp. has set a quota for the two months' period of the drive at 850 commercial jobs. The quota is based on the budget of approximately 51,000 electric refrigerators to be sold during the year 1935, using a ratio of 1 to 10, which makes the commercial refrigeration objective about 5,100 jobs for the year.

A breakdown of the quota according to system groups is shown on the schedule which follows:

Binghamton	90
Eastern	30
Elmira	50
Empire	47
Lockport-Lancaster	35
Rochester	133
New England and Canada	88
Patchogue	8
Staten Island	55
Florida	11
K-T-I-M	35
Louisiana	4
South Carolina	15
Electric and Gas Utilities	8
Metro. Edison-New Jersey	150
Northwestern Pennsylvania	48
Southwestern Pennsylvania	43
Total	850

During 1934 the national commercial refrigeration sales were about one commercial to 10 domestic. The Utility Management Corp. feels that its properties could surpass this mark because:

"We have facilities to do the job in rural as well as urban areas. Power consumers know that excellent service is no stranger to us. We know exactly where our commercial customers are located. We already have a business relationship with every commercial prospect. We have easy access to the credit situation of commercial prospects."

Planned Selling Necessary

Some of the utility's operating properties merchandise commercial refrigeration directly to consumers and others assist dealers in sales without directly merchandising.

The commercial refrigeration market, says the utility, requires sound business tactics and planned salesmanship to get orders. It is important that definite plans be made to cash in on the sales potential in each of the different divisions of commercial business.

In its letter to various properties outlining the special drive on commercial refrigeration, beverage cooling, and water cooling, the Utility Management Corp. suggests how commercial refrigeration may be promoted.

"After the opportunities and facts pertaining to each commercial market have been reviewed," reads the letter, "it would pay to make a complete analysis of the territory. Decide how each of these markets can be covered most effectively. Map out a definite plan of action during the period of the campaign."

Check Market Coverage

"To secure an over-all picture of the commercial potential in your territory, consult city and telephone directories, and if necessary a tour of the territory should be made. Examine sales records and see if each specific commercial business has con-

tributed to part of the total business sold. If it is felt that any one business has been neglected, check the reason and arrange for proper coverage of that market in the future.

"Analyze the sales personnel. Decide if you have the man power required. Check each salesman's qualifications and determine whether you have the proper man in each territory. Determine each man's weak point and help him to overcome it. Plan any action to strengthen the selling organization."

"Check prospect files. Go over each prospect list and have each individual prospect analyzed. Clean out the dead wood and classify the others according to type of business. Promote a

prospect building campaign—point out the importance of systematic prospecting through user calls, canvassing, contacts with other salesmen, building reports and other methods. See that prospects are secured from all of the various commercial businesses.

Salesman's Plan of Action

"The individual salesman should prepare an over-all plan of action and follow it religiously. He should plan each day's work ahead and arrange a schedule that reduces loss of time to a minimum. Calls on various prospects should be scheduled for a time when they are in the best position to talk."

"The salesman should also have a definite program for self-improvement—he should study the various commercial refrigeration applications, manufacturers' sales plans and all other sales materials."

The utility states that several of its properties have promoted domestic business through organizing the salesman's daily work. Salesmen are assigned at least 10 cards a day on which is given the customer's name and kwh. consumption by months for at least a year. Provision is also made on the card for a survey of appliances in use in the consumer's home. A similar method, recommends the

utility, should be effective in organizing the commercial salesman's daily tasks.

"The salesman," says the letter, "must be equipped with the commercial selling materials available. He cannot tell a convincing story about commercial refrigeration without backing up his statements with printed material. Check the supply of sales literature and selling materials. See that the supply is complete."

"User contacts should be a definite part of each commercial salesman's work. At least one user should be called on each day. Salesmen have found users to be the best source for new prospects. They have also profited through the sale of additional commercial equipment to many users."

"Secure testimonials from as many users as possible. The value of local testimonials back up sales arguments and assist the salesmen in proving electric refrigeration superiority."

"Make a weekly progress check during the campaign. At regular weekly intervals, review your charted commercial course for the campaign and check accomplishments. Then map out the course of action for the next week. Decide which specific commercial markets require the most attention for that period and plan accordingly."

Progress and accomplishments of

each salesman should also be closely checked at this time, and their plan of activity for the immediate future reviewed and tied in with the over-all commercial program for the period.

The utility recommends that its properties take advantage of the wide advertising campaign of refrigeration manufacturers.

\$2,590 Beer Cooling Order Sold to Haverhill Cafe

HAVERHILL, Mass.—W. L. Thompson, Inc., General Electric distributor for this territory, recently completed installation of a \$2,590 beer cooling and dispensing job, including a Russ dispenser and a large compressor, for Guido Scamporino's Roma Cafe here. The distributor has secured an order from the same cafe for a combination glass and dishwasher installation.

Equipment installed is in addition to other G-E beer cooling equipment formerly installed and consists of a Russ dispenser with a large compressor.

The first installation raised the weekly sale of beer from 10 to 72 half-barrels, and the recent installation has pushed it up another half dozen barrels.

"SUMMER FAG" DISAPPEARS



when air-conditioning comes in!



"FREON," a safe refrigerant, assures cooling comfort in office installations, large and small.

Now summer days are pleasant days in air-conditioned offices. Gone are the wilted collars, the fagged spirits, the languid groups around the water coolers. There's no let-down in efficiency. Refreshing, energy-sustaining air keeps executives and staff workers in cool comfort all summer long.

Today business men no longer question the value of air-conditioning. The unit air-conditioner has multiplied your opportunities for selling cooling comfort. The occupant of the smallest individual office, as well as the corporation owning the largest building, is your prospective customer.

Decisions to "air-condition" are being made every day. Comfortable working conditions in offices during summer months pay dividends in increased efficiency. In stores and shops, air-conditioning increases sales and safeguards merchandise.

"Freon" air-conditioning is superior air-conditioning. "Freon" is the ideal refrigerant for every type of office installation, for air-conditioning of stores, hotels, restaurants



Mackubin, Legg & Co., Bankers, Baltimore, Md. Air-conditioned with "Freon" by Westinghouse.

and for household refrigeration. It is safe and non-toxic. It is odorless and non-flammable. Where "Freon" is the refrigerating agent, maximum safety and comfort are assured.

When you sell an air-conditioning system in which "Freon" is used, you sell a refrigerant with an outstanding record of safe and dependable performance.



FREON

REG. U. S. PAT. OFF.

a safe refrigerant

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE



Office of Mr. Wilson, president of the Wilson-Toomer Company, Jacksonville, Florida, showing air-conditioning installation by Servel.



A modern office air-conditioned with "Freon" by the General Electric Company.

ELECTRIC REFRIGERATION NEWS

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The Farm Market

INQUIRIES from readers of ELECTRIC REFRIGERATION NEWS frequently are straws-in-the-wind which indicate the direction currents of trade in the industry are likely to take.

For instance: For weeks before the revived interest in coin-meter selling became the liveliest topic of discussion in electric refrigeration last spring, inquiries kept pouring into this office for sources of supply for the meter devices. And then a wave of meter-plan merchandising hit the industry simultaneously and from practically all quarters of the country.

During the last few months the question which has occurred and reoccurred among inquiries received by the News has been: "Where can we get oil-burning or gasoline-driven refrigerators for farm use?" This query has easily led the list of all requests for information from readers.

Thus it is quite obvious to editors of ELECTRIC REFRIGERATION NEWS that refrigeration for farms is likely to be a most timely subject of conversation in the industry in the very near future, and that a good market is probably all ready and waiting for the first merchandising organizations which come along and really do a job of promotion in this field.

But the matter of these inquiries is not the only sign pointing to a strong demand for farm refrigeration plants. A good many factors seem to be favoring the man who would cultivate the rural market.

First of these factors to pop into the mind, of course, is that of the money which the Roosevelt administration has been pouring into agrarian districts. This money has come as rewards for not raising hogs, for slaughtering cattle, for plowing under every third row, for curtailing cotton production, and for similar cockeyed ideas. But no matter. *How* the farmers have been obtaining this money from the government is of small concern to the salesman of refrigeration equipment. The important thing is that they have the money, and that *they have it in cash*.

Anyone who has ever eaten a meal in a genuine farm home will instantly realize that of all families the farmers would have use for household refrigeration more than any other group. Nobody eats any better meals than farmers, as a class, and perhaps not even the day laborers depend so much on healthful, untainted food to "keep them going" in the pursuit of their livelihood.

Farm families are generally big families (particularly if you count in a hired man or two), and each member of the family is sure to be a hearty eater. No four or five cubic foot refrigerator will satisfy their needs—not by a jugfull. Only the very largest sizes will do.

Moreover, the refrigeration salesman who raps at the farmer's door (he will probably look in vain for a doorbell, if he has been a metropolitan pavement pounder) will find himself in

virgin territory. In this case it is not a question of replacing another type of refrigeration. The ice man doesn't get out that far. For the farmer it's either mechanical refrigeration or none at all (if one doesn't count the cellar and the "spring house"—and no salesman worth his salt *would* consider these makeshifts as providing refrigeration).

To farmers who live along the routes of power lines the answer is simple: install an electric refrigerator. But the majority of farm homes are not served by electricity. In these homes, then, the oil-burning and the gasoline-driven refrigerators should have almost immediate acceptance.

Household refrigeration, of course, is not the only type of equipment which can be sold to farmers. Milk cooling has long been one of the most profitable segments of the commercial refrigeration business. To the dairy farmer an adequate milk-cooling plant is almost a necessity—and is required by law (if strictly interpreted by the examiners) in a great many states. Installations for cooling dairy products generally run into considerable money, too, and some concerns have actually made the sale of this type of equipment the mainstay of their business.

Nor is the list of farm refrigeration needs confined to milk cooling and food preservation for the immediate family. In one of the better plays on Broadway this season, "Fly Away Home," part of the plot hinges around the almost desperate need of a young-couple-in-love for a large electric refrigerator which could be used for egg storage. They wanted to start a chicken farm, but had to have the electric refrigerator before they could set up in business, and were willing to break laws (and did!) to get that refrigerator. People who saw that play got a very clear idea of how important modern refrigeration can be to a rural family. To them it wasn't a luxury, nor a convenience, nor just something to show off to the Joneses. It was an absolute necessity.

To the rural market has been sadly neglected by refrigeration sales organizations. The pickings were (comparatively) too easy in the metropolitan areas. Selling to farmers is slower business, requires a different approach and technique, and has a relatively high sales cost. Moreover, most distributors and dealers have been stopped by the fact that so many farms are not served by power lines. Even today there are but a few non-electric mechanical refrigerators on the market to serve this need.

Those who have been able to obtain franchises for these oil-burning or gasoline-driven refrigerators, however, will in all likelihood cash in on the opportunity that awaits them this year. And distributors of electric refrigeration equipment will do well to study closely charts of electrical power distribution in their territories, for (judging by all the signals visible at the present) intense cultivation of the farm market should prove profitable in coming months.

WHAT OTHERS SAY

The Other Side of Contests

THE contest as an advertising device is being used so generally at present, and its obvious advantages have been so well accepted that it may be worth while to call attention to the other side of the picture, and to note the limitations and disadvantages inherent in the use of this method of attracting public attention.

For one thing, it should be remembered that while the contest gets enormous attention from those interested in participation, its value in building sales among the large section of the public which is not responsive to contest appeals is greatly if not entirely eliminated. That is, the publicity value for the product, because of the emphasis necessarily laid on the contest proper, is lost in large measure, and must be made up for in some other way.

When the contest involves purchase of the product as a requirement for participation, immediate sales results may pay the cost involved, and may compensate for the lack of general publicity value of the advertising. Furthermore, this method provides an effective means of sampling, as regardless of the motive which inspires the purchase, actual use of and familiarity with the product tend to promote repeat orders if it proves to be satisfactory in quality and price.

In the case of contests where use of the product is not a primary requirement, and where general interest alone, stimulated through contest publicity, is the chief advantage, it might be well to check offsetting factors to determine whether the method is likely to be profitable under those conditions.—*Advertising Age*.

LETTERS

Rate for Directory

Green Foundry & Furnace Works
Des Moines, Iowa

Editor:

Will you please send us a copy of your 1935 MARKET DATA BOOK?

This is in connection with our renewal of a year's subscription to ELECTRIC REFRIGERATION NEWS, check for \$3.00 being enclosed.

SHIRLEY PERCIVAL,
President.

Answer: We are pleased to acknowledge receipt of your check in the amount of \$3.00 for a one year renewal of your subscription to ELECTRIC REFRIGERATION NEWS.

With reference to your request that we send you a copy of the 1935 MARKET DATA BOOK in connection with your renewal, we wish to advise that the DIRECTORY is not given as a premium with subscription orders. The 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY AND MARKET DATA BOOK, which is published in two volumes, is available at \$5.00 for the set of two books. The combination rate for a one year subscription to ELECTRIC REFRIGERATION NEWS and both volumes of the DIRECTORY is \$6.50. Either volume of the DIRECTORY, when purchased separately, costs \$3.00.

We will be very glad to allow you a combination rate on the purchase of a DIRECTORY and will fill your order upon receipt of your additional remittance in the amount of \$3.50.

'No Solicitor' Rules

Graybar Electric Co., Inc.
Graybar Building
King and Occidental Sts.
Seattle, Wash.

Editor:

I have repeatedly noted in the REFRIGERATION NEWS warnings against unauthorized agents for REFRIGERATION NEWS subscriptions.

As a wholesale salesman for the Graybar Electric Co., Kelvinator distributor in this territory, I have been particularly interested in having my dealers and their salesmen obtain copies of the special subscription offer you recently made.

Realizing the procrastinating tendencies of most of these dealers I have been collecting the money for these subscriptions and forwarding the latter to you myself. I hope in so doing that I have not been too seriously violating your "no solicitors" rules.

Your price of 25 cents for these four issues is ridiculously low. To a refrigerator salesman, particularly a Kelvinator salesman, they are invaluable and I certainly want to commend you for making available such complete information.

H. J. MITCHELL,
Kelvinator Sales Dept.

Answer: Thank you for your letter of April 20 regarding your practice of obtaining subscriptions to ELECTRIC REFRIGERATION NEWS from your dealers and salesmen.

We greatly appreciate your cooperation and that of other traveling representatives of refrigeration equipment, manufacturers, and distributors who make it a practice to tell dealers and salesmen about the News. Our warnings refer to irresponsible solicitors unknown in the community.

Good Factory Pictures

Peerless Ice Machine Co.
515 West 35th St.
Chicago

Editor:

I want to congratulate you upon your fine photography, as exemplified by the pictures you took around our plant on the occasion of your recent visit. I did not believe it possible to take snapshots under the light conditions present at the time.

R. W. KRITZER,
President.

Freon Chemical Symbol

Kinetic Chemicals, Inc.
Wilmington, Dela.

Editor:

In the April 24 issue of the News there appeared an article on the properties and characteristics of common refrigerants written by K. M. Newcum.

On page 22 under the heading of "46 Freon" the statement was made that Freon is FFl_2F_2 . This looks very much like those lines which you read at the bottom of a column, such as $\text{XZ}\alpha\epsilon\delta\gamma\chi$.

Freon is dichlorodifluoromethane, sometimes called F-12, and has the chemical formula CCl_2F_2 .

I am looking forward to seeing you Wednesday, May 22, at which time I understand the News will be host to members of A.S.R.E.

R. J. THOMPSON,
Refrigeration Engineer.

Service Articles

Wood's Service Store, Inc.
5266 University Way, Seattle, Wash.
Editor:

How about a few more articles of interest to us poor benighted service men? Should have at least one every issue!

ART DE DESROCHERS.

Answer: A regular series of weekly service articles and lessons was inaugurated five weeks ago in ELECTRIC REFRIGERATION NEWS, and we trust reader De Desrochers is now happy.

Incidentally, even commission salesmen should profit by thorough study of these authoritative service articles.

Free Kilowatt Hours

Boost Appliance Sales

The Hartford Electric Light Co.
266 Pearl St., Hartford, Conn.

Editor:

We have your letter of April 27 inquiring as to results of our free kilowatt hour offer. There has been a steady increase in the percentage of customers who are taking advantage of the offer, as shown by the following figures:

Percentage of Customers Obtaining Free Current	
December	28%
January	32%
February	34%
March	35%
April	37%

You appreciate the fact that it takes a good deal to move the habits of people and to get them started to buying apparatus really necessary to use this offer, and to get enough people to act to appreciably change the over-all community average.

Perhaps the best indication of response is that the increase in electric range installations in the five months covered by the offer has been two and one-half times as great as in the corresponding period of a year ago.

While we haven't exact figures from all the dealers on refrigeration, we understand that their electric refrigeration business has also been substantially greater and that their small appliance business is materially better.

We have now reached a figure of 890 kilowatt hours per customer, from a figure of 853 at the start of the offer.

RALPH D. CUTLER,
Vice President.

No Runs, No Hits, 2 Errors

Municipal Electric Lighting & Power Plant

32 South Eighth St., Richmond, Ind.

Editor:

I have just read in the May 1 issue of ELECTRIC REFRIGERATION NEWS that you carry a notice listed "G-E Graduates 120 from 'Little Women's School'."

I wish to correct the statement concerning "G-E Graduates." As we are a municipally owned light and power plant, we naturally cooperate with all local dealers, and the title G-E Graduates, of course, is not a correct one. We have numerous makes of appliances in our all-electric kitchen, besides G-E.

I have also noticed that the name of the home economist in the paragraph is Miss Edythe Monroe, which you will notice should be Miss Edythe Moore.

I know it is difficult to keep an accurate check on names, but I should appreciate having the proper credit line given our activities.

Thank you very much for your courtesy in rectifying these errors.

EDYTHE E. MOORE,
Home Service Director.

Out of Our Weight Class

83 S. Lansdowne Ave.
Lansdowne, Pa.

Editor:

Enclosed is my check for renewal of subscription.

In answer to Mr. A. C. McClure in "Letters," on your wish to "sock" Bill Grunow. I'll bet if you do it unjustly you will wind up behind the eight-ball, for Grunow has a good wallop as well as an excellent refrigerator.

G. S. MCKEE.

Answer: Just for the record, we have never stated a desire to "sock" Bill Grunow. That was Mr. McClure's idea, not ours. Bill has always been pretty decent to the editor; and besides, he outweighs us by about 40 pounds and has arms like a blacksmith's!

Good Ideas

The Rudolph Wurlitzer Mfg. Co.
North Tonawanda, N. Y.

Editor:

We want you to know that when we were in the refrigeration business we thoroughly enjoyed ELECTRIC REFRIGERATION NEWS as it contains a lot of meat which was food for thought—it gave us a lot of good ideas which we benefited by.

Very best wishes for continued success for the ELECTRIC REFRIGERATION NEWS.

E. H. PETERING,
Asst. General Sales Mgr.

Weber Designs Case For Super Markets

LOS ANGELES—To meet the demands imposed by the development of "super" food markets here and elsewhere, Weber Showcase & Fixture Co. of this city has designed a new type of refrigerated display case for application in these huge, modernized retail food stores.

The new Weber case provides for improved display of meats, temperatures of from 34° F. to 38° F. with relative humidity of from 80 to 85 per cent, quick and easy service by clerks, and elimination of fogging and sweating between glass.

Large Monthly Business

These super drive-in markets do a volume of business amounting to between \$50,000 and \$100,000 a month, of which between 25 and 30 per cent is in meats.

According to Weber officials, within the past few months many hundreds of the new Weber cases have been installed in the chain of super markets built by Ralph's Grocery, Safeway Stores, A & P stores, Piggly-Wiggly, and Thriftmart markets, owned by Young's Market Co.

Young's is now completing one of its most elaborate markets in the heart of Hollywood, Calif., and Weber equipment being installed consists of 63 ft. of single duty display case, and two 9-ft. reach-in butter refrigerators.

Weber Showcase & Fixture Co. has just issued a new portfolio giving details of how refrigeration dealers can create new business by assisting food merchants to modernize in accordance with the super-market idea.

8 Storage Rooms Kept to Close Temperatures By Frick System

LAFAYETTE, Ind.—Minardo Brothers, fruit and produce dealer in this city, keep eight storage rooms at closely specified temperatures by means of Frick refrigeration equipment recently installed.

Four banana rooms and one cheese room are held at 38° F., and three vegetable rooms at 35 to 38° F. Temperature control in all rooms is automatic.

The large vegetable storage room in the basement of the building is equipped with two Clarage fan units and has a duct system to distribute the air. In all vegetable rooms, provision is made for fresh air ventilation.

Fan Units Cooled by Brine

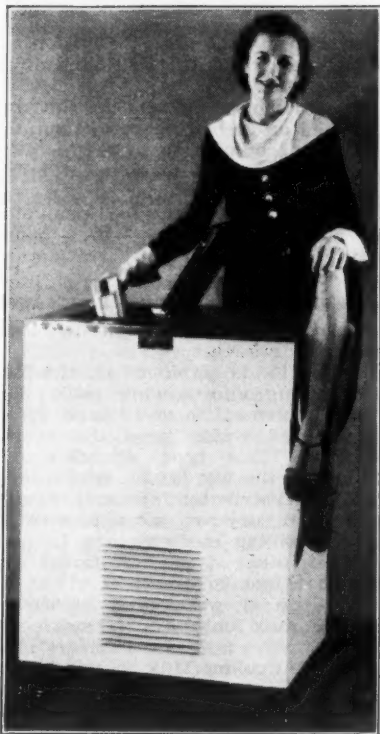
One or two fan units, supplied with "cold" from the brine cooler, are located in each of the banana and vegetable rooms. When the rooms reach the required temperature the brine supply is automatically shut off. The cheese room is refrigerated by regular pipe coils, in which brine is circulated.

The compressor is connected to a large brine cooler, consisting of a tank 11 ft. x 5 ft. x 4 ft. deep, in which are submerged 2,000 ft. of 1½-in. pipe. Equipment includes four Westco brine pumps and a total of six Clarage fan coolers.

Three of these coolers were already installed; the three new ones are equipped with 3-hp. motors and blowers having a capacity of 12,400 cu. ft. of air per minute.

The automatic control equipment includes one float type feed valve and automatic water regulating valve, one high-pressure motor cutout, one water pressure failure switch, brine type switch to start and stop compressor motor (thermostatically operated), a pilot switch, three room-type thermostats, motor starting switch, four brine pressure gauges, set of ammonia pressure gauges, four brine type relief valves, and brine thermometers.

Compact



In case you get around to looking at it, that upon which the girl sits is Frigidaire's new self-contained single-sleeve ice cream cabinet.

Temprite Describes All Products in New Catalog

DETROIT — Temprite's complete 1935 line of beer, water, and beverage coolers, equalizer tanks and control tanks is described in a catalog just issued, by Temprite Products Corp. The catalog was designed by Temprite's advertising manager, Gordon Muir.

No radical changes have been made in the design or construction of the various models, but certain refinements are listed as having been incorporated by Temprite engineers. The company is also introducing a complete line of beer and water coolers using Freon as the refrigerant.

After a sectional diagram, showing the mechanical and operating principles of Temprite coolers, the catalog lists four general methods of application: multiple, circulating, dead-end, and self-contained, and explains the benefits of each type of installation.

Multiple systems of water coolers for factory and office uses are next explained, followed by illustration of a duplex installation, with a three-faucet beer and water dispenser, a root beer dispensing barrel, a chef's refrigerator box, and an ice cream cabinet all duplexed to one centrally located condensing unit.

Water cooling units using Freon differ in appearance from those using sulphur and methyl by the addition of an external heat exchanger, already almost a standard item with Freon. Freon beer and water cooling units are listed, the latter for multiple, circulating, and dead-end uses.

A number of self-contained coolers for industrial application are also described in some detail.

Models are shown with both single and double jets, or with one bubbler and a glass filler, as may be desired. Another line of industrial coolers are displayed, designed for remote applications.

Beer and beverage coolers occupy a considerable portion of the catalog, with models available for serving one, two, or three kinds of beer, and with SO₂, methyl chloride, or Freon as the refrigerant.

Frigidaire Ice Cream Cabinet Is Portable

DAYTON — A new portable single sleeve ice cream cabinet complete with compressor has been introduced by the commercial division of Frigidaire Corp.

The Frigidaire "cold control" is standard equipment.

The cabinet is 38½ in. high, 29 in. wide, and 19 in. deep. The rectangular sleeve is 20½ in. long, 10½ in. wide, and 14½ in. deep, and has a capacity of two 2½ gal. ice cream cans, or 8 gals. of packaged ice cream.

Non-rusting metal covers the top, and white dulux covers the one-piece wrap-around type exterior metal covering.

Servel Equips Federal Relief Quarters

PORTSMOUTH, N. H.—H. E. Humphreys, Servel commercial distributor in Concord, N. H., reports the sale of Servel commercial refrigeration equipment for installation in the Transient building on the site of old Fort Constitution here.

This old Fort has the unique distinction of being New Hampshire's only sea port. The Fort was erected before the Revolutionary War, and will be remembered by the "old timers" as the point at which the treaty of peace between Russia and Japan was effected by Teddy Roosevelt at the close of the Russo-Japanese War.

Although still a military port and a part of the country's military defense system, there are certain buildings which are not now needed by the military residents and which have been converted to temporary quarters for transients, under the auspices of the Federal Relief Administration.

TEMPRITE

CATALOG for 1935

IN ADDITION to comprehensive descriptions of Temprite line of beer, water and beverage coolers, equalizer tanks and control valves, suitably illustrated, this new catalog contains a wealth of engineering information. The chapter on "Selection of Condensing Units" and the pages devoted to the new series of coolers using Freon as the refrigerant, render this edition of more than usual interest to the refrigeration industry.

Complimentary Copy Mailed on Request

TEMPRITE PRODUCTS CORPORATION

Originators of Instantaneous

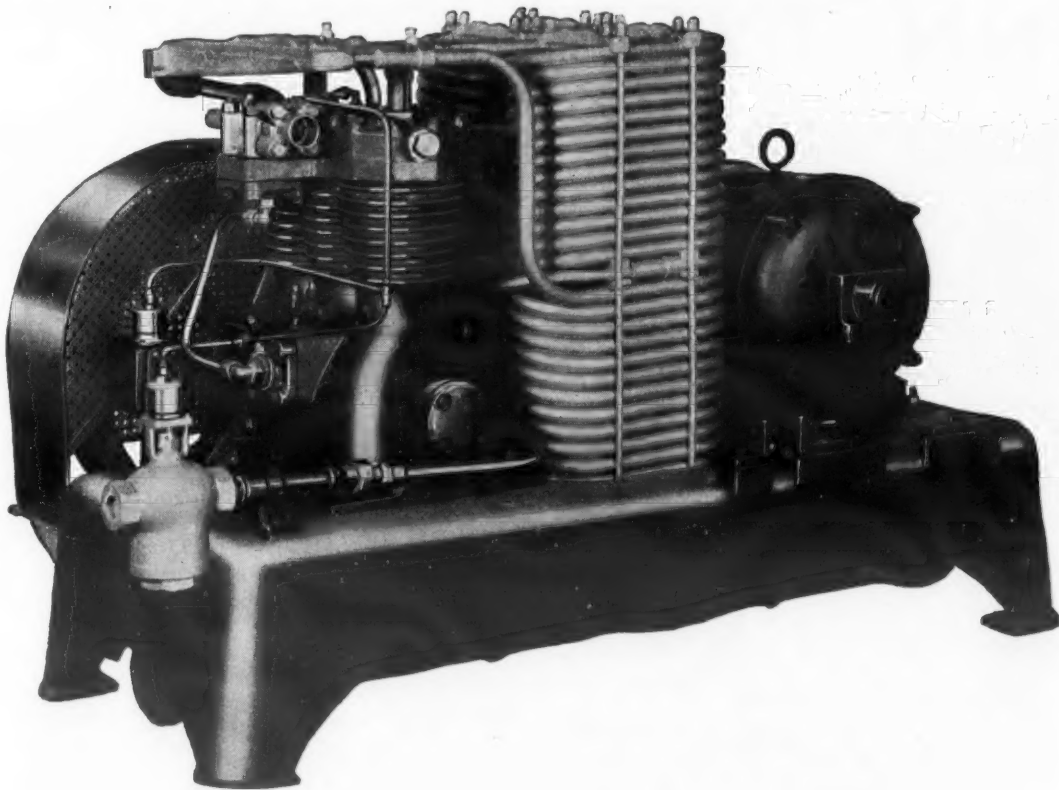


Liquid Cooling Devices

DETROIT

MICHIGAN

1935 . . . A GOLDEN OPPORTUNITY



Never before has the Refrigeration Industry had such an opportunity for expansion. Never in the 12 years of this Company's history has it been as active. Never has its research and engineering staff been of greater service in spite of the fact that Universal Cooler has, in past years pioneered many significant developments.

Today 18 Universal Cooler standard models from ¼ to 15 h.p. economically designed for all types of refrigeration are available to manufacturers of fixtures and the country's leading refrigeration engineers.

That these units have won the Industry's recognition is clearly evident by the steady increase in demand for them. The last 6 months show sales for both commercial and domestic units just 712 per cent ahead of the corresponding 6 months last year.

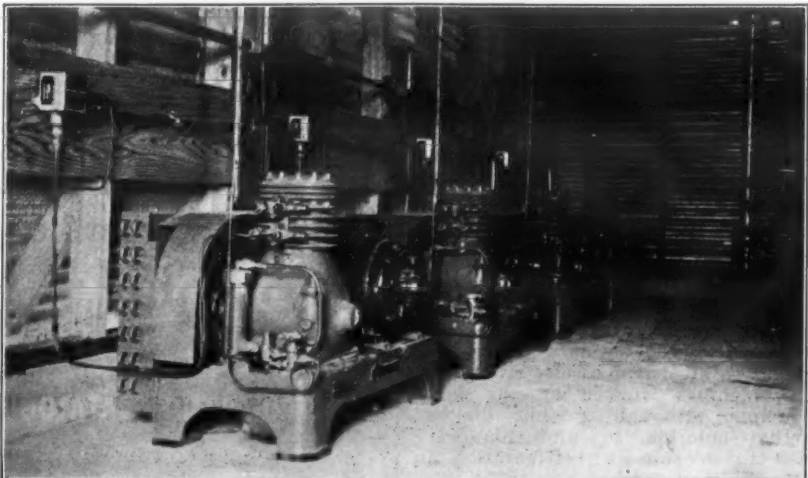
UNIVERSAL COOLER CORPORATION

DETROIT, MICHIGAN

BRANTFORD, ONTARIO

MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

In a Texas Packing Plant



These four Lipman condensing units (all model 202) supply refrigeration to a chill room and storage room in the Colley & Thomas Bros. packing plant at Eagle Lake, Tex. Fedders evaporators are used and the installation was made by the Way Engineering Co. of Houston.

MILK COOLING

Cost of Cooling Milk by Ice & Mechanical Refrigeration Studied on 44 Farms

MECHANICAL refrigeration is used extensively in milk plants and other city establishments for cooling and storing milk and cream. Likewise, in the past five years the use of mechanical refrigeration for cooling and storing milk on dairy farms has increased rapidly. To obtain definite information on what may be expected by dairy farmers in general from small

refrigerating machines, a study was made at 44 dairy farms in Maryland and Virginia where mechanical outfits of various types using electric current as power have been installed. The amount of milk handled ranged from 15 to 200 gallons per day per farm.

Data were obtained on methods of arrangement and operation, power consumption, cost of equipment and repairs, and efficiency of the different outfits in comparison with each other and with equipment in which ice was used.

The results are presented and discussed in this article, with suggestions for effective arrangement and operation. Plans are also included for an inexpensive home-made storage tank or refrigerator box, depending on which is to be used with the machine. Such a tank or box, if properly constructed, is as efficient as and often cheaper than one shipped in from a factory.

Purpose of Cooling Milk

Milk, when drawn from the udder, offers both an ideal food and a culture medium at optimum temperature for the development of many kinds of bacteria. Unless bacterial growth is checked, undesirable fermentation may take place in the milk causing off flavors and odors or souring, and thereby preventing its use for market purposes.

After the milk is produced, cold is the chief factor used on the farm to check growth of bacteria in it. For example, in one experiment milk with a bacterial content of 16,000 per cubic centimeter kept sweet for about 36 hours when held at a temperature of 75° F., 80 hours when held at 55°, and 180 hours when held at 40° F.

Bacterial off flavors may develop at any temperature but they develop more rapidly at the higher tempera-

PUBLISHED on this page are excerpts from a report "Cooling Milk on the Farm with Small Mechanical Outfits," prepared by the United States Department of Agriculture.

This reporting was made from an intensive study completed late in 1934. Those participating in the study included R. P. Hotis, associate market milk specialist, Division of Market Milk Investigations, Bureau of Dairy Industry, and J. R. McCalmont, junior

tures.

In other words, cooling delays changes in the milk which affect quality and palatability and helps to maintain its original quality. Therefore, it is of the utmost importance that milk be promptly cooled to and stored at a temperature of 50° F. or lower.

No means of cooling will offset carelessness in production and handling, however. The same attention to sanitation in these matters should be given when mechanical refrigeration is used as is necessary with any other means of cooling.

Means Used in Cooling Milk

On farms three means are employed for the cooling of milk, namely, water, ice (either natural or artificial), and mechanical refrigeration.

Water from wells, springs, or supply tanks, even under the best conditions, is usually not cold enough to cool the milk below 50° F. in warm weather, and there are difficulties in using water alone for storage of milk, so that its use is limited.

The use of ice or mechanical refrigeration is then the only means whereby milk can be cooled and stored on most farms during warm weather at

Results of Government Survey

agricultural engineer, Division of Structures, Bureau of Agricultural Engineering.

Of particular interest is the data collected on cost of operation, running time, and comparison of refrigerating cost with ice and mechanical refrigeration.

Also given are many pertinent hints on how to obtain the best results from a mechanically refrigerated milk cooler.

temperatures low enough to check bacterial growth.

Where ice is employed on the farm for cooling and storing milk, it is almost universal to use a tank wherein ice and water form the cooling medium. This type of storage is known as the wet tank. However, on producer-distributor farms where milk is bottled, dry-box storage with ice as the cooling medium may be used, but on other types of farms this system is not so practical.

The use of water and of ice for cooling milk on dairy farms is discussed more fully in Farmers' Bulletin 976, Cooling Milk and Cream on the Farm.

With mechanical units either wet-tank or dry-box storage can be used economically. Where wet storage is used with mechanical units, the evaporating coil for absorbing the heat is placed in the water in the storage tank.

Where dry storage is used the cooling medium is usually a brine solution confined in an iron or copper tank within the storage box. The evaporating coil is located in the brine tank, and by absorbing heat from the brine keeps it chilled.

In wet storage there are only two transfers of heat, namely, from the milk to the water in the storage tank, and from the water to the coils; whereas in dry storage there are three transfers of heat, that is, from the milk to the air in the box, from the air to the brine solution, and from the brine to the coils.

Factors Influencing Use of Refrigerating Machines

The rapid increase in the use of refrigerating machines on dairy farms is due chiefly to (1) improvement in the machines, (2) the extension of electrical lines into the country, (3) irregular deliveries of ice, (4) saving in labor, and (5) regulations of health departments.

Manufacturers of refrigerating machinery have made great progress in recent years in developing the small self-contained compression machines which are almost universally used for small-scale mechanical refrigeration. The principal parts of such a machine are the compressor and motor, condensing coils, evaporating or cooling coils, and the storage tank or box. In the machines much improvement has been made in the compressor, the expansion valve, and the thermostatic control.

The rapid extension of electrical lines into the country has made the use of refrigerating machines possible on many farms. In 1924 only about 2.7 per cent of the farms in the United States were served with high-line electricity; in 1932 this had increased to 11 per cent.

In sections where farmers depend for their ice supply upon manufactured ice, irregularity of delivery has turned many to the use of refrigerating machines. From 1917 until a few years ago farm laborers were difficult to secure. As a result any machine that would lessen the farmer's manual labor was a welcome addition to the farm.

Health-department regulations also have been an important factor in influencing a change in refrigerating methods. In most markets over which public-health authorities have control it has been the practice to set a maximum temperature for the milk when it reaches the city market.

This temperature in some cities is as low as 40° F. Although these temperatures are attainable with ice, an abundant supply must be present at all times. The ice takes up extra room in the tank, and the dairyman must keep a watchful eye to see that the amount is sufficient to maintain the temperature desired. Mistakes in judging the right amount of ice may lead to a poor-quality milk.

Types of Refrigerating Machines Studied

The refrigerating machines observed under actual working conditions and discussed herein were compression machines, all driven by electric motors. All machines worked on the same principle, although sulphur dioxide, methyl chloride, or ammonia were used to accomplish refrigeration in different machines.

Cost of Outfits

The cost of outfits was obtained on 32 farms. On 23 of these farms a

complete outfit had been purchased, including the mechanical unit (comprising the compressor and its motor), a manufactured cooling tank or box, coils, and a circulating pump with its motor.

In this group the cost of the complete outfit per cubic foot of storage capacity averaged \$16.56 and ranged from \$10.40 to \$30.50 per cubic foot. Eleven outfits, or 48 per cent of those in this group, cost between \$10 and \$15 per cubic foot, and 8 outfits, or 35 per cent, cost between \$15 and \$20 per cubic foot.

In 9 cases no tank or box was purchased with the outfit, and the cost of the tank or box was not obtained. For this group the average cost of the mechanical outfit per cubic foot of storage space was \$13.45, with a range from \$8.80 to \$21.20. For 6 plants, or 66 per cent of this group, the cost was between \$8 and \$15 per cubic foot of storage.

In table 1 the cost of the complete outfits is figured on the basis of rated

Table 1—Original Cost

Cost of 23 mechanical outfits arranged according to rated storage capacity per number of 10-gallon cans.

No. of Farms	Rated Storage Capacity 10-gal. cans	Price Rated Complete Outfit	Average Price Per 10-Gal. Can
7	4	\$350-\$500	\$410
7	6	\$328-\$700	\$481
6	8	\$485-\$635	\$554
2	10	\$510-\$550	\$530
1	14	\$675	\$675

storage capacity per 10-gallon can. It is interesting to note in this tabulation that the average price per outfit increases as the size of the machine increases, but the price per 10-gallon can of storage capacity decreases as the size increases.

With the nine outfits where no tank or box was purchased, there were an insufficient number to tabulate in the above manner. However, the average cost on these farms per 10-gallon can of storage capacity was about \$62.

Cost of Repairs

The cost of repairs over a period of from 1 to 5 years was obtained on 19 farms. The machines had an average age of 2 years 8 months. The average cost for repairs was \$4.20 per year. The repairs were of a varied nature, the more common being the regulation of the automatic switch, the replacing of worn belts, and the fixing of leaks that had developed in the coils so that new refrigerant had to be added.

In one case the valves of the compressor had to be replaced. In some cases the firm selling the machine charged a flat service rate per year, for which a representative was to make as many trips as were required in order to keep the machine running. Any parts which had to be replaced were to be paid for by the owner.

Location of the Machine

On dairy farms mechanical units are installed in three locations, namely, in the same room as the milk-storage tank or box; in a separate room from the storage tank or box; or outside of the milk house, the machine being protected under a shedlike structure or in some instances under a shed with lattice work on the sides.

Of the 44 machines studied, 34, or about 77 per cent, were in the milk room; 9, or about 20 per cent, were in a separate room; and 1, or about 2 per cent, was outside the building. Of the machines located in the milk room, about 54 per cent was placed at the side of the storage box and 46 per cent on top of the storage box.

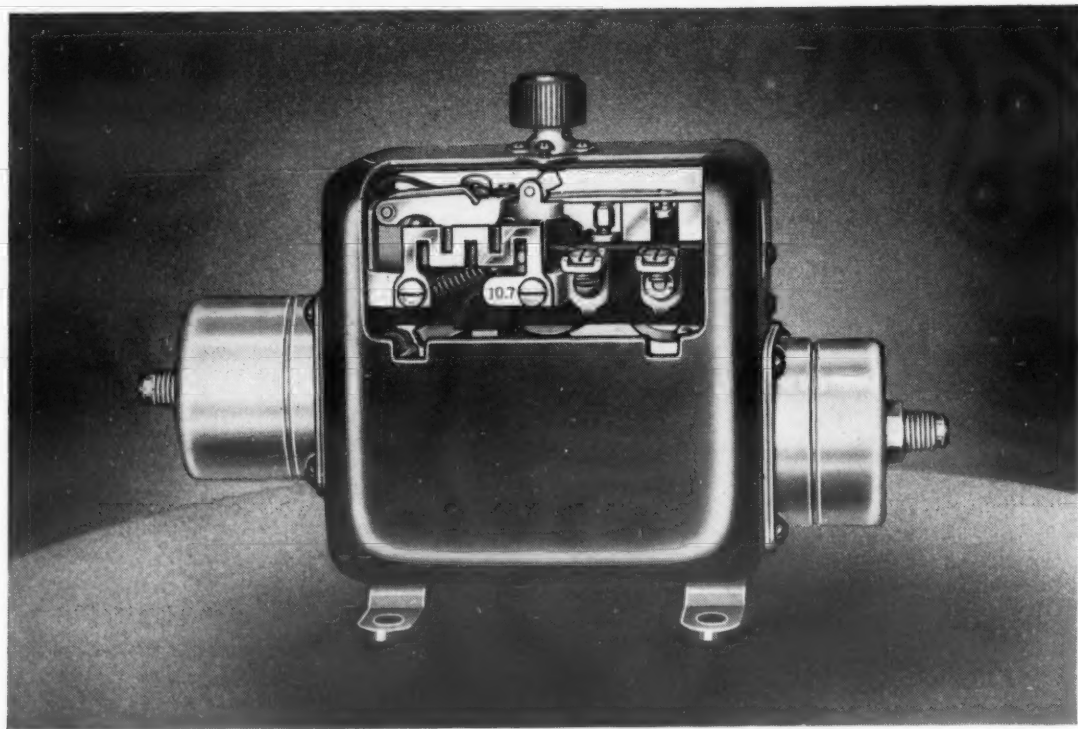
After observing these machines under working conditions, the conclusion was reached that the mechanical unit of this type should be located in a well-lighted, well-ventilated room separate from the storage or milk-handling room for the following reasons: Nearly all these small machines are air-cooled.

As soon as the dairyman starts cooling his milk, the thermostatic control starts the machine running with the result that any dust about the machine, in the room, or in the air pulled from outside by the fan, is circulated about. If the machine is in

(Continued on Page 13, Column 1)

ANNOUNCING

PENN TYPES LC AND LSC



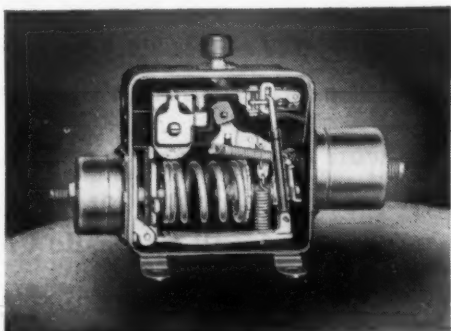
WITH "BUILT-IN" THERMAL OVERLOAD PROTECTION

Here is one of the most vital announcements ever made to the electric refrigeration industry. Alert to new trends and because of our intimate contact with the industry's requirements, the world famous Penn Types L and LS controls now are available with "built-in" thermal overload protection.

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Service and installation engineers everywhere will welcome Types LC and LSC, not only because they are old friends with a new feature, but because they eliminate extra units, extra mountings, and extra installation expense formerly necessary to obtain thermal overload protection.



When you study the compact construction of these new switchest you'll find many other outstanding features too. A convenient top-reset button to be used also as an off-switch. A trip-free overload device. Readily interchangeable grid type heaters.

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As a result of our many years' experience with various overload elements, Types LC and LSC have been designed, not for a solder pot, but for the more dependable bi-metallic type of overload protection—an extremely simple mechanism for fool proof, constant service through the years.

We urge you to write today for complete information, descriptive literature, and the reasonable prices.

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MILK COOLING

Government Survey Tells How to Get Best Results from Mechanical Milk Cooling

(Continued from Page 12, Column 5) the milk room, some of this dust is apt to come in contact with the milk or the utensils in which the milk is handled.

Another objection to having the machine in the milk room is that the machine generates heat, which is dissipated over the room and at times may raise the air temperature more than 6° F. This means that the machine must overcome this additional heat in cooling the milk. The machinery needs oil, and it is hard to use oil without dropping some. The older the machine the more oil leaks out. Materials of this nature have no place in a milk room, especially on top of the storage tank.

Storage Tank or Box Size

It is important that the storage tank or box be of the proper size for the amount of milk to be handled. A good general rule would be to purchase a size sufficient to care for the maximum daily quantity of milk produced at any season of the year, and no larger.

The economy of this can be shown by considering farm No. 4 (table 5) where it is possible to check the heat loss through the walls of the tank by the amount of ice that was melted per 24 hours.

One hundred and fifty pounds of ice was melted per 24 hours in cooling 101 gallons of milk through a range of 15° F., down to 46°, while holding the tank temperature at 37°. There were

243 B.t.u.'s removed per watt-hour of power used.

On this farm, as is the general practice, the night's milk is cooled and stored and the morning's milk is cooled only, before shipping. The amount of power used for cooling and storing was 1,046 watt-hours per can cooled, not including the power for keeping the tank cool.

With these figures, table 2 has been prepared to show the total amount of power required per can cooled for such an eight-can storage outfit when used to cool and store different quantities of milk.

The table shows that when cooling 4 cans per day the power required is 1,430 watt-hours per can, and when cooling 16 cans the requirement is but 750 watt-hours per can produced. In other words, if the tank or box purchased is too large, the additional cost of electric current to supply the heat lost through the walls will soon amount to more than the advantage of the extra room.

Size Compressor Needed

Approximately 0.0585 pound ice-melting capacity is required to give one gallon-degree of refrigeration; that is, to cool one gallon of milk 1° F. Since in a well-constructed storage box used to capacity the milk-cooling load is equal to 70 per cent of the refrigeration load and the heat loss 30 per cent, the refrigeration required per gallon-degree in ice-melting capacity, or the melting-ice equivalent, as it is known

perature range of cooling, by the maximum number of 10-gallon cans of milk to be cooled. The figures given under refrigeration required per day represent the total amount of ice required to cool 10 gallons of milk, while the compressor rating represents the capacity of compressor needed figured on a 12-hour running time per day.

Table 3—Size of Unit

Compressor capacity required per 10-gallon can of milk to be cooled to and stored at 40° F.

Range of Cooling Temperature (° F.)	Melting Ice Equivalent Per Day of Refrigeration Lbs.	Per Hour of Compressor Rating Lbs.
10.....	8.4	0.7
20.....	16.8	1.4
30.....	25.2	2.1
40.....	33.6	2.8
50.....	42.0	3.5
60.....	50.4	4.2

Location of the Brine Tank In Storage Box

A number of the outfits studied had dry-storage boxes. When this type of storage is used with a refrigerating machine on the dairy farm, the most advantageous location of the brine container or tank is at the top of the storage box.

Either copper, galvanized iron, or boiler plate may be used for constructing the brine tank; the last would probably be the cheapest. If boiler plate is used, a protective coat of red lead will prove very satisfactory. If the evaporating coils are of copper, a copper tank would probably prove more satisfactory, as it would eliminate electrolysis, which causes corrosion.

The brine can be made either of sodium chloride (common salt) or calcium chloride. The latter is generally used, as it has a lower freezing temperature with the same concentration. The quantity of brine required in the tank depends on the quantity of milk to be cooled daily, the desired cooling temperature, and the size and insulation of the box.

However, as a general rule, with calcium chloride brine, one should figure on having about 1½ to 2 gallons of brine in the tank per gallon of milk cooled per 24 hours. In making up the brine, 2½ pounds of calcium chloride, with one ounce of lime for preventing electrolysis, should be added to each gallon of water.

The average temperature of the brine usually used on dairy farms is 20° to 25° F.

Location of Thermostatic Control in Storage Tank

In order to maintain a nearly constant temperature in the storage tank or box, all electrically operated machines are equipped with a thermostatic control. This device starts and stops the machine automatically whenever the temperature in the box or tank increases or decreases a few degrees above or below the desired temperature.

With wet-tank storage it is customary to circulate the cold-storage water through a milk cooler in order to cool the milk as quickly as possible before setting the cans of milk in the tank. At one farm the tank was so constructed that it was possible to change the location of both the cooler intake and the cooler outlet in the storage tank in relation to the control device.

Three Arrangements Tried

Three different arrangements were tried for a period of four milkings each; namely (1) with the cooler out-

let at the far end of the tank and the cooler intake over the control; (2) with the cooler outlet and intake within one foot of each other and directly over the control; and (3) with the cooler intake at the far corner and the cooler outlet over the control.

Current Consumption

In arrangement No. 1 the average consumption of electric current per gallon-degree of refrigeration was 2.68 watt-hours, and the average period of time required for the compressor motor to start was 22 minutes after the water-circulating pump was started; in No. 2 the machine averaged 2.96 watt-hours and the compressor motor required 1.5 minutes to start; and in No. 3 the machine averaged 1.98 watt-hours and the compressor motor required 2.3 minutes to start.

In the absence of any data taken with instruments, such as measurements of water currents, temperature of box at all points, amounts of ice on coils before and after cooling, it is thought that this difference in watt-hours used per gallon-degree might be due to a better circulation of water in the tank, which helped to remove any accumulation of ice on the coils.

It was noted that in arrangement No. 3 the coils were more free of ice at the end of the cooling period than they were in arrangement No. 2.

Cooler Outlet Near Control

These figures seem to indicate that the cooler outlet should be placed over the control, and that the cooler intake should be as far from the control as possible.

However, with some machines there is a tendency to freeze considerable ice upon the top coils. In that case it is a good plan to extend the return pipe, with lengths of pipe having small holes drilled every few inches, around the inner periphery of the tank and just above the coils. This

(Continued on Page 14, Column 1)

Table 2—Power Requirements

Approximate power requirements for an eight-can storage-tank outfit when used for cooling and storing different quantities of milk.

Power Requirement Per Day	To Keep Tank Cool	To Cool					
		4 Cans; Store 2 Cans	8 Cans; Store 4 Cans	10 Cans; Store 5 Cans	12 Cans; Store 6 Cans	16 Cans; Store 8 Cans	
Total Watt Hours	3,627	5,719	7,811	8,857	9,903	11,995	
Per Can Produced (watt hours) ...	1,430	976	886	825	750		

12,706 B.t.u.'s of heat removed from the milk and cans. Since it takes 144 B.t.u.'s of heat to melt one pound of ice, the amount of ice used to cool the milk was 12,706 divided by 144, or 88.3 pounds of ice.

The remaining 61.7 pounds of ice melted was used to overcome the heat loss from the tank. Stated as a percentage, 59 per cent of the refrigeration was used in cooling milk and 41 per cent to keep the tank cool.

When under almost identical conditions an electric-powered mechanical unit was used, 8,857 watt-hours of power was consumed. Dividing this in the same proportions as was found for the ice, 5,226 watt-hours was used to cool the milk and 3,631 watt-hours to keep the tank cool.

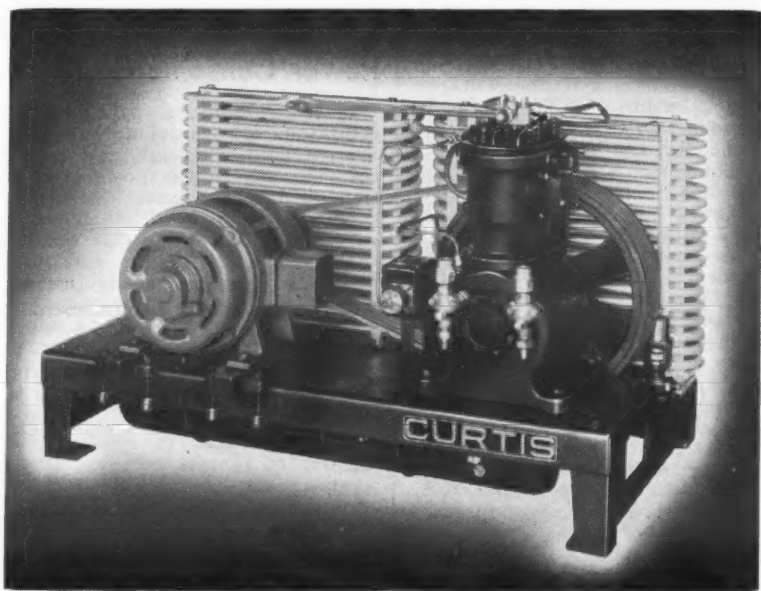
The 12,706 B.t.u.'s of heat removed in cooling the milk divided by 5,226 watt-hours used in cooling it, gives

in refrigeration, would be 0.084 pound of ice-melting capacity.

The capacity of the compressor needed can be found as follows: Multiplying the number of gallons of milk to be cooled per day by the number of degrees it is to be cooled by the refrigerating machine gives the total number of gallon-degrees; then multiplying the number of gallon-degrees by 0.084 gives the total ice-melting capacity needed per day.

Dividing this amount by the number of hours the machine is to run each day, for example, 10 or 12 hours, will give the rating of the compressor needed, in pounds of ice-melting capacity or melting ice equivalent per hour.

The size of compressor needed for cooling and storing milk can be computed readily by multiplying the figures given in table 3, under the tem-



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CURTIS, one of the oldest compressor manufacturers, offers one of the most complete lines of refrigerating units—1/6th to 2 H. P. air cooled; 1/3rd to 15 H.P. water

cooled—reflecting 81 years engineering, designing and manufacturing experience.

Some desirable territories are still open for reliable distributors. Write for details.

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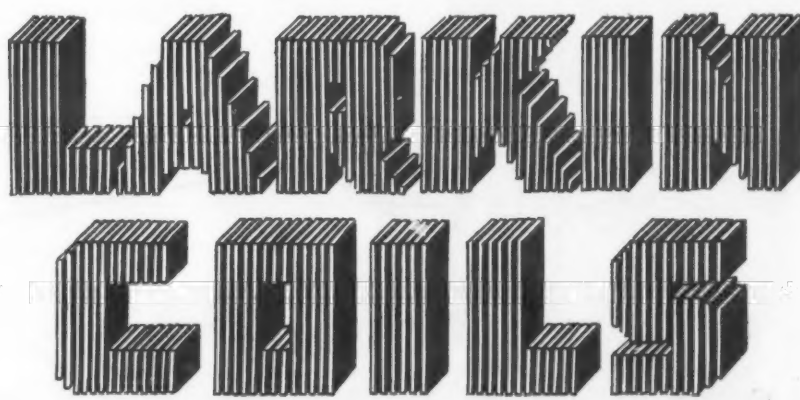
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102 - 5TH AVE.

MILK COOLING

Data Is Compiled on Temperatures of Milk Coolers

(Continued from Page 13, Column 5) plan will help to keep the amount of ice at a minimum, and the return water from the milk cooler will be cooled much more quickly.

Coils in Storage Tank

In wet-storage tanks three systems of installing coils in the tanks are used: (1) Bunched coils, made of pipe, placed in the center of the tank; (2) coils, made of pipe or radiator sections, arranged around the inner periphery of the tank; and (3) coils, made of pipe, placed on the bottom of the tank.

Bunched coils are difficult to support adequately, and care must be taken that the cans of milk do not strike against them. Also, ice accumulates more readily on bunched coils than on coils of other types, because the coils are closer to each other and farther from the return water of the circulating pump.

When the ice gets thick, it acts as an insulation.

Protection of Coils

Where coils are placed on the bottom or around the inner periphery of the tank, they should be adequately protected by a frame so that cans of milk will not come in contact with them.

The coils were all one-half inch in diameter, with the exception of the outfit on farm No. 26.

The length of coil used per cubic foot of tank space differed greatly in the different tanks observed. The range is from 20.9 to 60.6 inches per cubic foot of tank. Seven, or 35 per cent of these, had from 20 to 30 inches of coil per cubic foot, and the same number had from 30 to 40 inches per cubic foot.

Length of Cooling Coil

The proper length of cooling coil depends primarily on the design of the compressor and on the refrigerant used, although it is also influenced by the temperature range through which the milk is cooled. Since the compressor and the coils are part of the manufactured unit, the recommendation of the manufacturer for length of coils should ordinarily be accepted.

Farmers writing manufacturers for information regarding the selection of the proper size of refrigerating unit should give the following data: The maximum amount of milk to be cooled and stored per 24 hours at any one time; the range of temperature through which the milk is cooled, for example, from 95° to 40° F. if no well water is used; the temperature of the well water; and the thickness and kind of insulation in the tank.

Line Voltage in Relation To Machine

The voltage of the power lines supplying the farms included in this study fluctuated greatly. Recorder charts of the best or most uniform and the poorest or most variable line voltages showed the greatest fluctuation in voltage comes at about the time the milk is being cooled. No cases of motor damage due to too low or too high voltage were reported, and the efficiency of operation of the refrigerating units was not noticeably impaired.

However, on one farm where the delivered voltage fluctuated widely, the use of the electric range when the demands on the line were heavy so reduced the voltage on the farm connection that the motor of the refrigerating unit would not start. This is a rare case and was probably due rather to a service connection that was too light than to the power-line voltage being too low.

Changing Water in Storage Tank

Of the 21 dairymen who reported changing water, 8, or nearly 40 per cent, changed it every 12 to 16 weeks, and 9, or about 43 per cent, changed it every 4 to 8 weeks.

Observations indicated that care in keeping the cans and the milk room clean at all times saved frequent changing of the storage water.

Some dairymen washed the outside of the cans before putting them into the storage tank. Where such care was taken the storage water was in excellent condition at the end of five months.

New Water Not Cold Enough

The rise in temperature of the storage water when it was changed was from 8° to 28° F., and it required from 4 to 24 hours until the water again reached the original temperature. Not only is great power required, but in cases where the machine is working nearly to capacity, the night's milk would not be stored at as low a temperature as desirable.

However, the water in the tank should be changed often enough to keep it clean and free from objectionable odors.

The quantity of water in the storage tank, expressed in pounds of water per gallon of milk stored, ranged from 14 to 68 pounds for the 22 outfits. The reason for this wide variation is that the storage tanks are generally purchased with a capacity large enough to take care of the maximum milk production of the farm.

At certain seasons of the year the production falls off, necessitating the addition of more water to the tank in order to have the milk can submerged to the neck in the cold water. Thus with a tank of given size, the

Table 4—Data on Temperatures & Running Time

Data from 34 outfits showing average air temperature, average storage temperature, milk cooled, number of hours compressor motor was running, and consumption of electric current per 24-hour day over a period of 7 to 12 days in summer.

Group and Farm No.	Average Air Temperature	Average Tank or Box Temperature	Milk		Average Gallons Cooled Per Day	Average Refrigeration Daily	Consumption of Electric Current			
			Average Temperature to Which Cooled	Average Degrees Cooled			Average Per Gallon Degree of Refrigeration	Average Per Gallon Cooled Per Day	Average Running Time Per Day	
Group 1, Commercial Tank, Wet Storage:										
1.....	75	38	43	31	60	1,860	5,429	2.9	90.5	12
2.....	73	36	41	28	15	420	2,571	6.1	171.0	6
3.....	76	41	45	50	19	950	3,727	3.9	196.1	9
4.....	80	40	44	15	101	1,515	8,857	5.8	87.7	12
5.....	82	48	48	47	25	1,175	5,429	4.6	217.1	16
6.....	77	36	38	24	75	1,800	10,333	5.7	138.0	8
7.....	77	40	44	39	47	1,833	5,350	2.9	114.6	12
8.....	81	43	43	15	64	960	5,200	5.4	81.2	9
9.....	78	37	43	21	43	903	4,444	4.9	103.0	12
10.....	75	49	48	22	107	2,354	10,250	4.4	95.8	24
11.....	82	40	42	55	52	2,860	8,250	2.9	158.6	11
12.....	73	34	42	29	43	1,247	4,000	3.2	93.0	10
13.....	78	41	42	21	74	1,554	7,888	5.1	106.0	12
14.....	77	42	46	17	123	2,091	8,556	4.1	69.6	14
15.....	79	40	44	21	83	1,743	10,800	6.2	130.0	10
Average*.....	78	40	44	29	62	1,551	6,739	4.5	124	11.8
Group 2, Farm Built Tank, Wet Storage:										
16.....	73	40	45	14	150	2,100	11,143	5.3	74.3	13
17.....	80	36	36	31	43	1,333	8,875	6.7	206.0	18
18.....	79	39	40	22	32	704	4,818	6.8	150.0	10
19.....	63	41	44	55	68	3,740	6,667	1.8	98.0	8
20.....	76	43	44	51	53	2,703	6,429	2.4	121.1	9
21.....	80	37	37	21	46	966	3,571	3.7	77.6	9
22.....	77	45	45	20	114	2,280	5,571	2.9	57.6	15
23.....	79	40	42	20	65	1,300	6,750	5.2	104.0	17
24.....	63	36	41	18	90	1,620	6,555	4.0	72.8	9
25.....	77	43	41	24	93	2,232	9,875	4.4	106.0	12
26.....	74	42	46	15	107	1,605	10,000	6.2	93.4	13
27.....	85	43	47	14	94	1,316	9,125	6.9	97.1	15
Average*.....	75	40	42	25	80	1,825	7,532	4.7	105	12.3
Group 3, Dry-Box Storage:										
28.....	78	44	37	22	71	1,562	7,333	4.7	103	12
29.....	80	37	39	30	121	3,630	15,833	4.4	131	19
30.....	47	34	37	25	86	2,150	10,000	4.7	116	6
31.....	73	40	44	48	56	2,688	12,667	4.7	226	13
32.....	73	41	39	21	199	4,179	24,833	5.9	125	18
33.....	75	39	36	20	200	4,000	28,750	7.2	144	23
34.....	84	42	43	25	47	1,175	10,909	9.3	232	17
Average*.....	73	40	39	27	111	2,769	15,761	5.8	154	15.4
Average* of groups 1 and 2	77	40	43	27	70	1,673	7,091	4.6	115	12.0
Average* of all groups *Average of averages.	76	40	42	27	78	1,898	8,876	4.9	123	12.7

less milk stored the more water is needed.

Data on Operation of Machines

Of the 44 farms at which information was collected on use of small refrigerating machines, detailed observations of the operation of the machines were made at 34 farms, on air temperatures, storage temperatures, quantity of milk cooled, consumption of electric current, and running time. The data in tables 4 and 5 are based on observations taken over a period of 7 to 12 days at each of the 34 farms during the hottest months of the year. These data were obtained by installing tested watt-hour meters and recording thermometers at the farms, and instructing the dairymen in making temperature observations on the milk with a tested thermometer.

This procedure was adopted because it was reasoned that if a mechanical outfit would function satisfactorily during the warmest months, it would do its work adequately in cooler weather. The average age of the machines on which observations were made was 1 year 6 months, with a

range in age from 1 month to 5 years 2 months.

Running Time Per Day

The approximate running time of the refrigerating machines, shown in table 5, was calculated as follows:

(1) The number of revolutions of the meter disk per minute was multiplied by the meter constant (the meter constant is the number of watt-hours registered by one revolution of the meter disk) and by 60 minutes to determine the rate of power consumption of the motor in watt-hours;

(2) the number of kilowatt-hours a day registered on the meter was divided by the calculated rate of power consumption in kilowatt-hours while the motor runs an hour.

Since the number of kilowatts used per hour was so small that it could not be read directly from the meter dial, it had to be calculated from the revolutions per minute of the meter disk and the meter constant.

For example, a watt-hour meter rated by the manufacturer as having a meter constant of 2.5, registered 8 kilowatt-hours during a day and the average of several counts of the number of revolutions per minute of the meter disk was 5. Then the current used per hour would be: $5 \times 2.5 \times 60 = 750$ watt-hours or 0.75 kilowatt-hour.

The running time would then be $8 \div 0.75 = 10.7$ hours a day. The running time figured by this method of calculation was checked against the actually measured running time for several machines and found to be correct within 2 or 3 per cent.

The time that a machine will run each day is an important factor to be considered in selecting refrigerating equipment for the farm. So far as power requirements are concerned, a machine that runs 24 hours a day may use no more current than one that runs only part of the day.

This is shown by comparing the results for the machine on farm No. 10 with that on No. 14, where the running times were 24 hours and 14 hours respectively, and the power used per gallon-degree of refrigeration was 4.4 and 4.1 watt-hours.

However, the machine on farm 10, although working continuously, cooled the milk to only 48° F., which is barely low enough to meet the market conditions. Under such conditions, any power failure, break-down, or increase in the amount of milk to be cooled would make proper cooling difficult. Then, too, small refrigerating units are not designed for continuous operation, and the life of an overworked machine is comparatively short.

In this test there were so many variable factors affecting the running time and power consumption of each machine that it is difficult to determine definitely the effect of any one factor. However, in general, the results in table 4 indicate that a machine performing its work by running 8 to 10 hours a day is more economical than one running more than 14 hours.

Ten of the machines in groups 1 and 2 ran from 8 to 10 hours and averaged 9.1 hours daily, cooling 57.3 gallons of milk over a range varying from 18° to 55° F., and using 4.3 watt-hours per gallon-degree or 118 watt-hours per gallon cooled.

Six machines in groups 1 and 2 ran over 14 hours and averaged 17.5 hours daily, cooling 75 gallons of milk 26° to 44°, using 5.1 watts per gallon-degree or 130 watt-hours per gallon-degree cooled.

On comparing these two groups the advantage is seen to be with the machines running the shorter time. These 10 machines on an average cooled less milk per day but to a lower temperature, and used less power per gallon-degree of refrigeration, than the six running longer periods.

The time the machines operated per day was not affected noticeably by the temperature to which the milk was cooled. The data in table 4 show very little relationship between cooling temperature and running time. The differences found cannot be explained except by considering all factors in each case.

Power Consumption

In the following paragraphs the conditions on individual farms are compared to bring out the things that seem to govern the power consumption on different farms. No dominant factor is shown for all machines; each case has its own special conditions that govern the power consumption per gallon-degree of refrigeration.

The machines on farms Nos. 21 and 22 were identical in all respects, yet the former machine used 3.7 watt-hours per gallon-degree of refrigeration, and the latter used 2.9 watt-hours (table 4).

This difference in consumption of electric current is best explained by a study of the separate factors on each farm.

On farm No. 21 the milk was cooled to a lower temperature through a greater range in temperature. There was 2.5 times as much milk cooled on farm No. 22 as on No. 21, while the

(Concluded on Page 15, Column 1)



Wagner Type RBZR Capacitor-Start Induction-Run CAPACITOR MOTORS

The Wagner type RBZR is designed and built especially for refrigerator and air-conditioner service. It is ultra-quiet, long-lived, built to give many years of trouble-free service. Available in 1/4 hp and smaller.

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Switch hub is of bakelite, assuring trouble-free switch actuation.

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Governor mechanism is silent and positive-acting, made of rust-proof steel, silenced with felt bumpers.

Rotor is dynamically balanced to eliminate vibration.

Quick make-and-break, long-lived starting switch is thoroughly insulated with bakelite.

The Wagner type RBZR is but one of many types of small motors manufactured by Wagner, such as repulsion-start-induction, split-phase, polyphase, direct-current, etc. For complete description of all types of Wagner motors, ask for Bulletin 167 (small motors) and Bulletin 174 (polyphase motors.)

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Survey Compares Mechanical Refrigeration With Ice in Milk Cooling Tests

(Concluded from Page 14, Column 5)

power consumption was about 1.8 times that of machine No. 21. The air temperature was 80° F. and the tank temperature 37° on farm No. 21, while on No. 22 the air temperature was 77° and the tank temperature 45°.

In the case of these two machines it is shown that the most economical use of the tank was obtained when operated close to capacity and the tank temperature was not too low. The same relationship is seen in the power consumption per gallon of milk cooled, farm No. 21 using about 78 watt-hours and farm No. 22 about 58 watt-hours per gallon.

The economy of operation of a machine should be measured by the power used, both per gallon-degree of refrigeration and per gallon of milk cooled. If the milk is cooled from body temperature to tank temperature by the refrigerating machine alone, the power consumption is low per gallon-degree but high per gallon cooled.

On farms Nos. 5, 11, and 20, where the temperature drop ranged from 47° to 55°, the power consumption was high per gallon cooled, and low for each gallon-degree of refrigeration. Farms Nos. 4, 26, and 27 used well water to precool the milk so that the machine cooled it just 15°. Here the power consumption was low per gallon cooled and high per gallon-degree.

The greater amount of milk cooled on farms Nos. 4, 26, and 27 would also help to decrease the power consumption per gallon, even though the average tank temperature was lower than on the other three farms, because a machine working at capacity tends to use less power per gallon.

A comparison of the results on farms Nos. 7 and 15 (table 4) shows that the machine on farm No. 7 operated more economically, cooling 47 gallons of milk through a range of 39°, than that on No. 15, cooling 83 gallons of milk through 21°. The tank temperature was the same in each case, and the air temperature was only 2° higher at farm No. 15.

Here the factors that affect the power consumption most are insulation and capacity. These two factors are hard to separate, since it was impossible in most cases to determine the refrigeration loss accurately or to observe the condition of the insulation in the tanks.

The tank on farm No. 7 showed a heat loss of 28 per cent, and that on farm No. 15 showed a loss of 43 per cent. Tank No. 7 was factory built with 2-inch cork insulation and 72 square feet of exposed surface. No. 15 tank was home constructed with 3-inch cork insulation, but had 116 square feet of surface exposed.

The high percentage of refrigeration loss from tank No. 15 was due largely to its being used at less than capacity; and perhaps to damp insulation, which would increase the amount of heat absorbed from the outside air.

Refrigeration Loss from Storage Tank or Box

In most of the storage units tested the refrigeration loss from the tank or box was approximately determined to be less than 50 per cent of the total refrigeration supplied by the refrigerating unit. From general experience a well-constructed, well-insulated tank or box cooling its capacity of milk, should have a refrigeration loss of less than 30 per cent.

The refrigeration loss for the different units included in this study ranged from about 23 to 66 per cent. On farms Nos. 4, 6, 13, 18, 19, and 21,

where the loss was determined by cooling the tanks with ice for a short time, it was 43, 49, 60, 59, 29, and 66 per cent, respectively, of the total refrigeration. Those having a large percentage of loss were being used at a low capacity.

Comparison of Farm-Built And Commercially Manufactured Tanks

Comparison of the results obtained with farm-built tanks and commercially manufactured tanks (table 4) shows the farm-built tanks were about as efficient as manufactured tanks. However, an important factor to bear in mind is that all home-built tanks contained one inch more cork board than the commercial tanks.

Comparison of Wet-Tank And Dry-Box Storage

In comparing the results of dry-box storage with those for wet-tank storage (table 4) attention is called to the fact that with dry storage there was an average of 111 gallons of milk cooled per day as against 70 gallons with wet storage. However, the average running time per day was 15.4 hours, as against 12 hours with wet storage.

The average power consumption per gallon of milk cooled with 5.8 watt-hours with dry storage, and 4.6 watt-hours with wet storage. From these data it is apparent that dry storage costs slightly more.

However, one fact to be kept in mind is that it is possible to cool to lower temperatures with dry storage, because the brine is held at a temperature below freezing, whereas storage water if held below freezing would form ice and could not be circulated through the milk cooler.

Comparison of Mechanical Refrigeration with Ice

In order to show a comparison between ice and the mechanical outfits and to give an idea of what might be expected under farm conditions, the use of the machine was discontinued on six farms and ice substituted for periods of 3 or 4 days. Enough ice was kept in the tanks to maintain, as nearly as possible the temperature used with the machines. The results for these six farms are presented in table 5.

Air temperatures, amount of milk cooled, temperature to which cooled, number of degrees cooled, and individuality of the machines are all variable factors which determine the power used per gallon-degree cooled. An additional factor when ice is used is the promptness of the iceman in servicing the tanks. For these reasons it is practically impossible to compare the individual farms.

However, in looking at the averages of the six farms, it is noted that the average daily air temperature is the same with ice as with the machines. The average storage-tank temperature, the average number of gallons cooled, the average temperature to which cooled, and the average number of degrees cooled are quite close, so that there is a difference of only 64 gallon-degrees between the ice and machines.

These figures show that it took 4.8 watt-hours of electricity or 0.123 pound of ice to cool one gallon through 1° F. and to hold the average storage temperature of about 39°.

If the cost of ice to these farmers

Table 5—Comparison of Ice with Mechanical Refrigeration

Comparison of ice with machines on same farms showing the average air temperature, storage temperature, refrigeration per day, current and pounds of ice used per gallon-degree, and per gallon of milk cooled.

Farm No.	Average Air Temperature When Using Machine Ice		Average Daily Storage Tank Temperature Machine Ice		Milk								Power Used For Gallon-Degree	Ice Used For Gallon-Degree	Power Used For Gallon Cooled	Ice Used Per Gallon Cooled
					Average Temperature to Which Cooled Machine Ice		Average Degrees Cooled Machine Ice		Average Gallons Cooled Per Day Machine Ice		Average Refrigeration Per Day Machine Ice					
	° F.	° F.	° F.	° F.									° F.	° F.	No.	No.	Gallon-Degrees	Gallon-Degrees	Watt-Hours	Lbs.	Watt-Hours	Lbs.
4.....	80	80	40	37	44	46	15	15	102	101	1,530	1,515	5.8	0.098	87.7	1.5
6.....	77	76	36	40	38	40	24	23	75	69	1,800	1,587	5.7	.124	138.0	2.9
13.....	78	69	41	38	42	42	21	20	74	68	1,554	1,360	5.1	.137	106.0	2.8
18.....	79	81	39	40	40	41	22	24	32	38	704	912	6.8	.135	150.0	3.2
19.....	63	64	41	44	44	44	55	52	68	70	3,740	3,640	1.8	.080	98.0	4.1
21.....	80	85	37	38	37	38	21	20	46	45	966	900	3.7	.166	77.6	3.3
Average	76	76	39	39.5	40.8	41.8	26.3	25.7	66.2	65.2	1,716	1,652	4.8	.123	109.6	3.0

was 40 cents per 100 pounds, the cost of electricity was 3½ cents per kilowatt-hour, and their period of warmest weather was seven months, the average cost of the electricity on each of these six farms would be \$110 less than the cost of the ice. No conclusions can be drawn as to whether this amount is sufficient to take care of interest, depreciation, and repairs on the mechanical units.

Summary and Conclusions

A refrigerating machine for cooling and storing milk on the dairy farm should be of such size that the compressor will not have to run over 14 hours per day, if efficiency of operation is to be assured.

The average cost of complete outfits on 23 farms was about \$7.69 per gallon of milk storage, and the average cost per 10-gallon can of rated storage capacity ranged from \$48 to \$103, the lower cost being for larger storage capacity.

Care should be taken to locate the compressor outside the milk-handling room where it will have good circulation of air.

The cost of repairs on 19 farms averaged \$4.20 per year.

Care should be taken to keep the water in the storage tank clean.

The amount of water in the storage tank will vary according to the amount of milk cooled.

The amount of coil to use per cubic foot of tank will vary according to the amount of milk to be cooled and stored per 24 hours; the range of temperature through which the milk will be cooled; the temperature of the well

water used through the surface cooler; and the thickness of the tank insulation.

Bunched coils are difficult to support rigidly, and ice forms on them easily. Line voltage may vary greatly on country lines, and if service connections are too light may cause motor-starting troubles.

Machines running on an average of 9.1 hours per day used less power per gallon of milk cooled and per gallon-degree of refrigeration than machines running on an average of 17.5 hours per day.

A well-constructed, well-insulated storage box cooling to capacity should have a refrigeration loss of less than 30 per cent.

Home-built tanks observed were as efficient as commercially manufactured tanks, but carried more insulation.

The power consumption is higher with dry-box storage than with wet-tank storage, but lower temperatures are possible with a dry box.

Cost of power was less than cost of ice; however, no data were available on depreciation, so this factor, and interest and repairs, are not taken into consideration in this comparison.

Bader Is Distributor for Hussmann in Tulsa

ST. LOUIS—W. C. Bader has taken over the Hussmann-Ligonier distributorship for eastern Oklahoma, with headquarters in Tulsa, officials of the Allied Store Utilities Co., manufacturer of Hussmann-Ligonier refrigeration equipment, have announced.

Packing Firm Changes To Trucks Cooled by Refrigeration System

ROCHESTER, N. Y.—Rochester Packing Co., Inc., is equipping its large fleet of trucks, which carry meat products throughout a state-wide territory with mechanical refrigeration.

Truck bodies in the mechanically refrigerated fleet are made by Meyer Body Co. Inc., and Fedders commercial evaporators are used.

The refrigerating mechanism is fully automatic and maintains the desired temperature within any required differential.

The refrigerator compartment in one typical truck used by the Rochester Packing Co., Inc., is 15 ft. 9 in. long, 6 ft. 1 in. high, 7 ft. 1 in. wide.

It is cooled by two Fedders fluted fin evaporators suspended from the ceiling. Two Fedders thermostatic expansion valves provide refrigerant control.

Condensing unit for this truck is driven by an electric motor which is plugged into the supply current while the truck is in the garage. While en route, the compressor is driven by a fully automatic gas engine equipped with thermostatically controlled starting system.

The gas engine normally operates about 15 minutes "on" and 1½ hours "off."

Gasoline consumption is about 1½ quarts per day.

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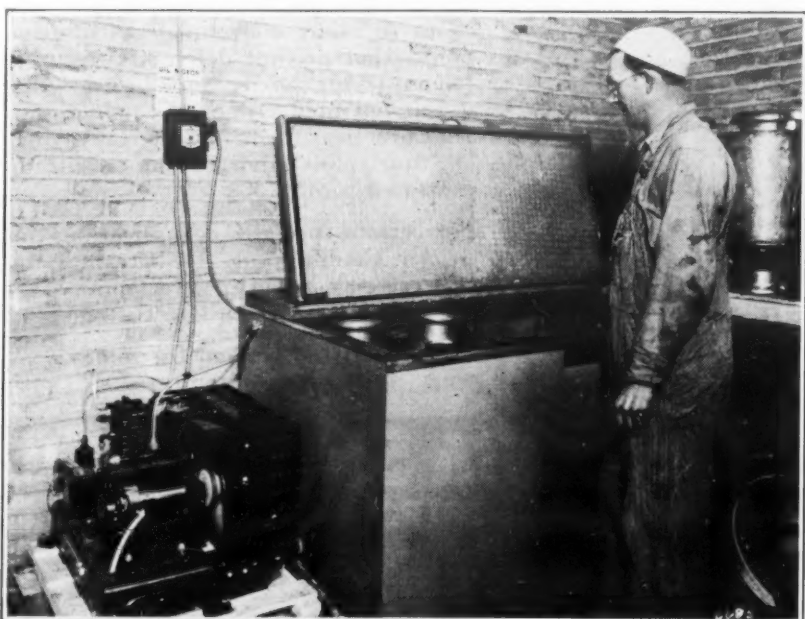
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Up-to-Date Farm Milk Cooler



Installation of a Frigidaire "Flowing Cold" milk cooler and a Frigidaire condensing unit on the Eby Farm near Madison, Wis. Note the way in which the compressor is set up from the floor.

REFRIGERATION **YORK** AIR CONDITIONING

SERVICE

Stuffing Box Seals and Direct Connected Condensing Units

Editor's Note: Different designs of stuffing box seals, operating principles of these seals, and methods of servicing them are described in the first part of this article, the fifth one in the series being written by K. M. Newcum for the use of refrigeration and air-conditioning installation and service men. The second section of the article deals with the flywheel and direct connected condensing units.

This week's article is a continuation of the one appearing in the last issue of the News in which the compressor and its component parts were described. Parts on the compressor described last week were: body assembly, housing assembly, crankshaft and connecting rod assembly, eccentric shaft and connecting rod assembly, piston and piston valve assembly, discharge valve assemblies, and cylinder head.

The first article in the series, which was published in the April 10 issue of the News, dealt with the fundamentals of refrigeration. Inasmuch as refrigeration is really a process of the removal of heat from a given space, these "fundamentals" consist mainly of the terms, definitions, and physical laws which are involved when heat is transferred from one substance or space to another location.

In the second article, appearing April 17, the three principal parts of the refrigeration system—cabinet, evaporator, and condensing unit—were described briefly and the operating cycle of a refrigerator was explained in detail. Also published with this article was the refrigerant pressure-temperature chart and an explanation of service gauges.

Properties which are necessary for a good refrigerant were explained in the third article which appeared in the April 24 issue of the News. The article also gave a detailed comparison of the physical properties and characteristics of the following refriger-

ants: sulphur dioxide, methyl chloride, ethyl chloride, ammonia, and Freon.

55. Stuffing Box Seals

By K. M. Newcum

The stuffing box seal is of major importance in that it provides a seal between the atmosphere and the inside of the compressor, hence the system.

Some of the earlier compressors employed the common packing gland between the revolving shaft and the compressor housing. This method required frequent tightening to compensate for wear, and often allowed considerable quantities of oil and refrigerant to escape, where the operating back pressure was above 0 lbs. gauge, or allowed air to be drawn into the system where the back pressure was below atmospheric or in a vacuum.

Later design incorporates the use of the flexible copper bellows, known as the syphon, or the use of a diaphragm. The flexing or bellows ability of the syphon or the diaphragm when incorporated in a seal compensates for wear and takes care of irregularities in alignment, etc.

One of the most common and widely used types of stuffing box assemblies is illustrated in Fig. 17. This design provides a gas tight seal between the revolving shaft and the atmosphere by means of a special bronze thrust collar or seal nose (B) which is held tightly against a shoulder on the crank or eccentric shaft (A) by means of spring (C).

The rotation of the shaft keeps the seal nose polished and smooth, and oil is supplied from the crankcase through a hole provided in the housing to effect a perfect seal and lubricate the seal nose and shaft shoulder.

A second gas tight seal is formed at the housing or crankcase by the gasket (E). This style is known as

Stationary Seal

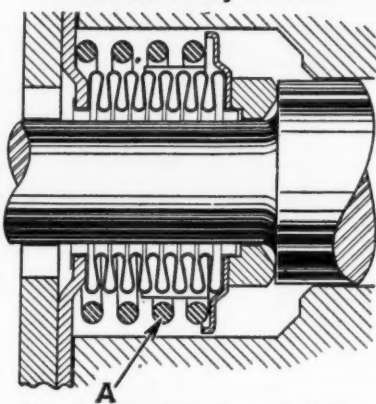


Fig. 19. Stationary seal design. "A" indicates spring.

the stationary syphon seal, that is, the seal does not revolve with the shaft, but remains stationary, and is held in place by the retainer plate (D).

The spring has a tension of approximately 35 lbs. pressure. Where this type of seal is used, a thrust or thrust bearing will be found somewhere between the crankshaft or eccentric shaft and the opposite side of the crankcase to provide bearing surface and to take up the friction caused by the tension of the spring.

The thrust with this style is always from the seal side of the compressor to the opposite side. Fig. 16 (shown in

Polishing Setup

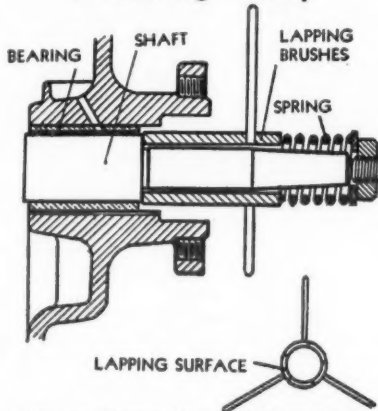


Fig. 20. Setup for polishing shaft.

May 1 issue) is a Frigidaire compressor using this type of seal, and the thrust bearings are located between the end of the eccentric shaft and a removable plug in the crankcase.

Note also in Fig. 16 the oil cup and oil passages from the crankcase to the seal, main bearings, and the thrust bearings.

One of the commonest causes of seal leaks is a shortage of oil in the crankcase. When the oil becomes low, the connecting rods do not splash enough oil to properly lubricate the stuffing box and it becomes worn and loses its seal. The seal nose wears flat, and the shoulder on the shaft becomes grooved.

A leak may be located by testing as given under the common refrigerants in the April 24 issue of the News. Repairing a seal leak is one of the most difficult jobs of servicing.

Seals of this type have been known to squeak, that is, set up a shrill noise while the compressor is operating. This is traceable to two causes.

First, the spring (C) may be rubbing against the revolving shaft, and second, the seal nose may be dry of oil.

When a squeak is noticed, the service man should first add a small amount of oil to the crankcase and allow the compressor to operate for several minutes. If the squeak dies down, it is apparent that the noise was due to lack of lubrication. If the squeak does not go away, the cause may be in the spring rubbing on the shaft.

To correct this condition, the pressure in the crankcase should be balanced to 0 lbs. gauge, the flywheel removed, and the retainer plate (D) removed carefully, so as not to disturb the gasket joint (E) or the seal at (A).

Remove the spring and examine it for bright shiny spots which would indicate friction. Remove any high spots with a rat tail file, pack the spring with graphite, and reassemble the spring retainer plate and flywheel. Put the compressor back into operation. If the stuffing box still squeaks it must be repaired or replaced.

Fig. 19 illustrates a later design of the stationary seal, with the spring (A) on the outside of the bellows. This design eliminates the possibility of seal squeaks due to the spring rubbing on the shaft.

Due to the more balanced design of this style the spring tension has been reduced to around 30 lbs. Some of these seals are interchangeable with the old style, but the checkup should be made before attempting to do so.

The same general repairing and replacing instructions apply to this style as the style in Fig. 17. If the seal is found to be leaking it should be removed and carefully inspected for the cause. The seal nose may have worn a deep groove in the shoulder

SERVICE OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN SERVICE WORK

No. 4—Evacuating the Suction Line

By K. M. Newcum

REASON:

It is necessary to evacuate the suction line to remove the coil, change valves on the coil, replace flare nuts, replace broken flares on line, etc.

PROCEDURE:

A. Attach compound gauge to compressor and put into operation.
B. Remove cap from suction line shut-off valve on cooling coil.
C. Stop the compressor.

D. Close the liquid line shut-off valve all the way to the right with a box wrench.

E. Check pressure on gauge. If pressure is anywhere near 0 lbs., the compressor will only have to be operated a very short time as two or three turns of the compressor will evacuate the line.

F. Run compressor just enough to pull gauge pressure down to between 0 lb. and 1 lb. pressure. (If the pressure drops below that point, open the suction line shut-off valve at the coil slightly until pressure builds up to 0 lb., then close valve.)

G. Close suction line shut-off valve on compressor all the way to the right with the box wrench.

H. Remove flare nut from suction line shut-off valve on compressor.

I. Check with instructor.

J. After checking with instructor, replace the suction line to its original position, and tighten. (Always examine the flare on the line, and if the flare is damaged, make a new one before putting the line back in place.)

K. Proceed as outlined in operation No. 5 to purge the line. Test for leaks with 26 per cent ammonia.

L. Check with instructor.

on the shaft. If this is found the compressor should be removed to the shop for a complete overhaul, or a new shaft and seal should be installed by the service man on the job if possible.

If the shaft is found to be in good condition that is, it is not grooved, pitted, or scored, it should be polished by using a tool such as illustrated in Fig. 20 with extra fine lapping compound.

All traces of the lapping compound should be removed by wiping the shaft with an oil rag. A new seal should then be installed. If the old seal that is being replaced was dry of oil when removed, the oil level in the crankcase should be checked. The compressor should be operated at a pressure slightly above 0 lbs. for at least 15 minutes, and the seal should

be tested for leaks with at least 25 lbs. pressure in the crankcase.

Many hours of valuable time may be wasted trying to lap a seal to a grooved shaft on the job, only to find that it can not be made to hold, in many cases. Seal and shaft repairing should be done by an experienced man with the proper equipment in the shop.

Many shops are equipped to recondition the worn shafts, by grinding the shoulder down until the groove disappears. This is considered satisfactory providing the groove is not too deep. As the shaft is case hardened and the hardness extends only a short distance in from the original surface of the shoulder and when removing a deep groove the metal is often cut in beyond the hardness, and will have

(Concluded on Page 17, Column 1)

Stuffing Box Assembly & Parts

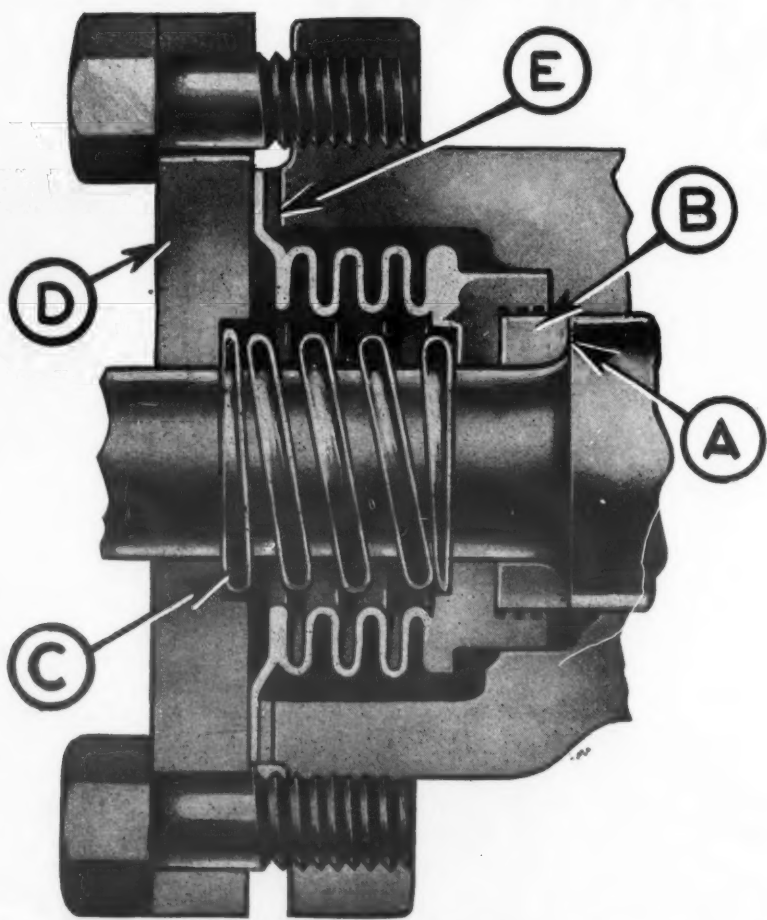


Fig. 17. Frigidaire stuffing box seal assembly. (A) Eccentric shaft shoulder; (B) bronze thrust collar or seal nose; (C) spring; (D) retainer plate; (E) gasket.

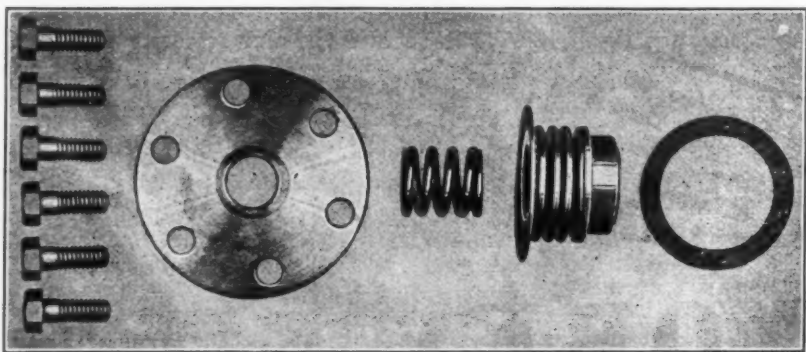


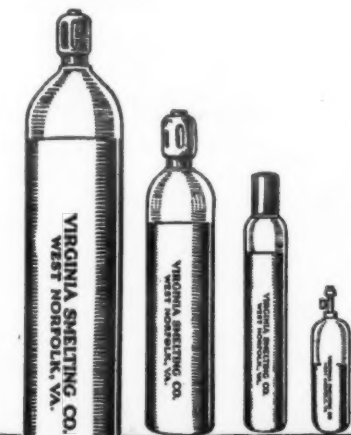
Fig. 18. Seal assembly parts (Frigidaire).

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Stuffing Box Seal, Flywheel & Direct Connected Machine

(Concluded from Page 16, Column 5)
a very short life when reinstalled in a compressor.

The worn seal may also be reconditioned by installing it on a mandrel in a metal lathe, and reshaping the seal nose with a cutting tool, to the shape of the original nose.

When this has been done the seal nose is then lapped on a piece of plate glass with bon-ami and oil by revolving it in a figure eight path until the entire surface is perfectly smooth. The seal should then be installed on the shaft it is to be used with, with the shaft revolving in a lathe, and the seal pressed tightly against the shoulder on the shaft. If both the shaft and seal are properly reconditioned, a perfect ring will be formed on the shaft and the seal nose will have a perfect undisturbed surface.

Fig. 21 illustrates a typical diaphragm type of stuffing box. This style employs the same general principle as the syphon type, insofar as it has a special bronze seal nose that forms a seal against a shoulder on the shaft.

This assembly does not employ the use of a spring at the seal, but the spring will be found on the opposite end of the shaft with the thrust toward the seal.

The same general repair and reconditioning applies, except greater care is needed in centering this type of shaft than with the more flexible bellows. Pressure should not be exerted against the flywheel toward the compressor body, for the shoulder of the shaft may be moved away from the seal nose and a leak would result.

Still another design known as the revolving syphon seal is illustrated in Fig. 22. In this assembly, a gas tight seal is formed between the seal nose and a special machined surface on the crankcase housing cover. A second gas tight joint is formed between a shoulder on the shaft and the syphon plate by a lock nut threaded on the shaft. This lock nut holds the syphon plate tightly to the shaft, and the seal revolves with the shaft.

Leaks with this type of seal would be between the seal nose and the housing cover, and would be the result of wear at that point. This style has the advantage of being on the outside, that is, all the assembly may be changed without disassembling the compressor.

The syphon is removed by removing the lock nut, and the housing cover is removed by removing the cap screws holding it in place. This style seal may be reconditioned just as the stationary seal. The housing cover may be resurfaced on a surface block or in a lathe.

Revolving Syphon Seal

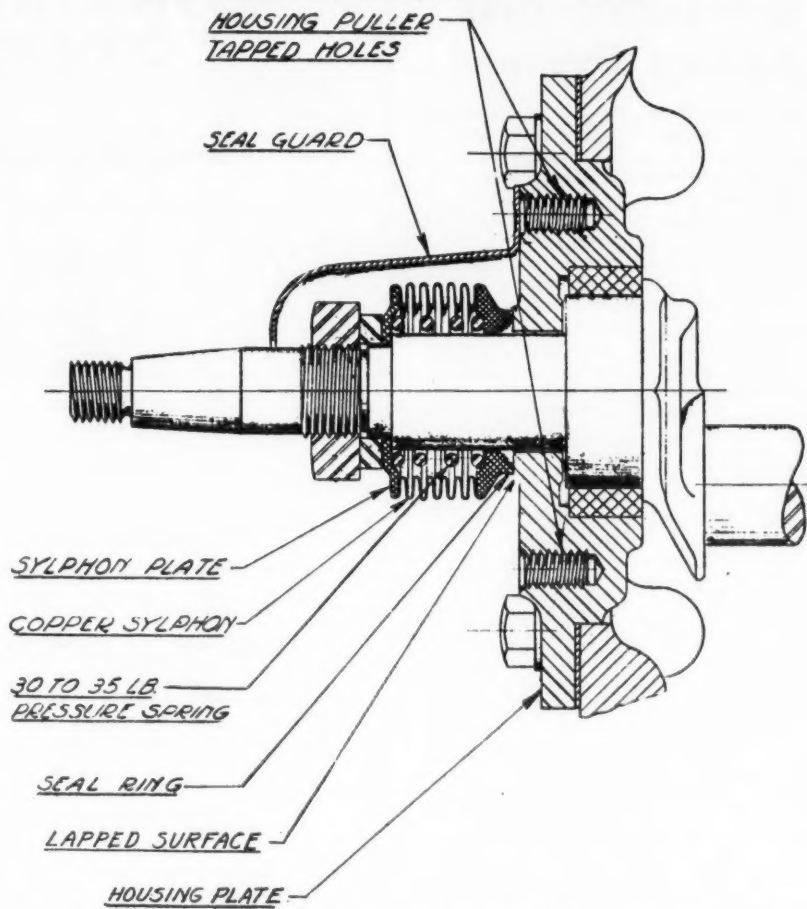


Fig. 22. Revolving syphon seal. In this assembly a gas tight seal is formed between the seal nose and a special machined surface on the crankcase housing cover.

The thrust with this type is toward the seal. In Fig. 22, the thrust is between the crankshaft and the main bearing.

56. Flywheel

The flywheel is attached to the crankshaft or eccentric shaft, and by means of a belt and motor pulley, transmits the power of the motor to propel the compressor.

Most of the models have the shaft tapered and a corresponding taper in the flywheel hub, to effect a tight fit. The shaft in this type is scored for a woodruff key, which fits into a corresponding groove in the flywheel.

A nut drawn up on the threaded end of the shaft holds the flywheel tightly into place to prevent any motion at this point. Should this nut become loose, the flywheel will make a rattling noise against the shaft. This noise is often mistaken for a worn or loose compressor part.

Some of the manufacturers models

have a straight shaft, and lock the flywheel into place with a set screw and lock nut.

The size, that is, diameter of the flywheel and the motor pulley, determines the speed of the compressor, as motors employed in refrigeration are usually of a standard speed, 1725 r.p.m.

Most of the compressors employ a flywheel with a V-groove for the belt. The width of the groove varies in the several makes and models. The width and depth of this groove is important in selecting the correct belt for replacement.

Other models use a flywheel with a flat smooth belt surface. This design lends itself to the self aligning of the belt, as the belt is guided by the motor pulley, and is free to travel on any part of the flat flywheel.

Some flywheels are built with spokes that act as fan blades. This feature aids in the air circulation over the compressor for cooling. Other models will be found to have plain spokes.

57. Direct Connected Condensing Units

Some of the reciprocating compressors are directly connected to the motor by means of a flexible coupling fitted on the motor shaft and the compressor shaft.

This design of course eliminates the use of the belt drive, but the speed of the compressor is the same as the motor, or 1,725 r.p.m.

Compressors that are directly connected to the motor have a very small piston, hence a comparatively low displacement per stroke. The displacement, that is, the volume of gas pumped, is made up by more strokes per minute. For comparison the average speed of the belt driven compressor is from 350 to 450 r.p.m.

This design brings out other important points, such as increased wear on the compressor parts, faster action of the compressor valves, and considerably more wear at the shaft seal. Parts used in this type of compressor, although the same in appearance and function as the slower speed type, are precision made, and the tolerances are held to closer limits.

Electric Kitchens Sold To 3 New Buildings Of Utility Company

ATLANTIC CITY, N. J.—Clark Adams, Inc., G-E appliance distributor here, has installed G-E all-electric kitchens in the new office buildings of the Atlantic City Electric Co. in Salem, Pleasantville, and Ocean City, N. J.

Cooking classes are being conducted by the electric company's home service department in the newly equipped kitchens.

Perry Elected President of Grunow Distributorship

WASHINGTON, D. C.—Warren F. Perry, who has been general manager of the Doubleday-Hill Electric Co., Grunow distributor in Washington and Baltimore, for a number of years, was elected president of the distributorship at a recent meeting of the board of directors of the company.

Diaphragm Assembly

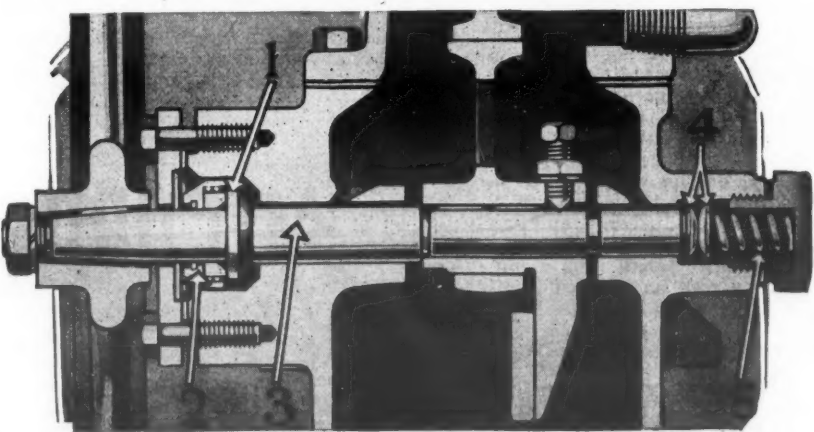


Fig. 21. Stuffing box and shaft assembly, diaphragm type. (1) Shoulder on shaft; (2) stuffing box; (3) shaft; (4) thrust washer; (5) spring.

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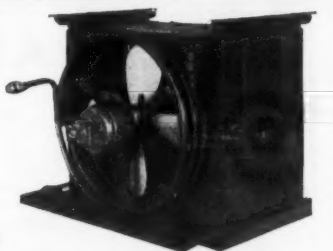
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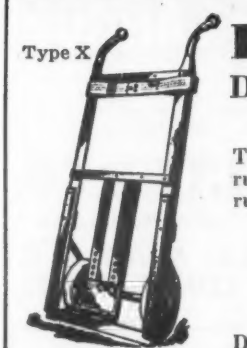
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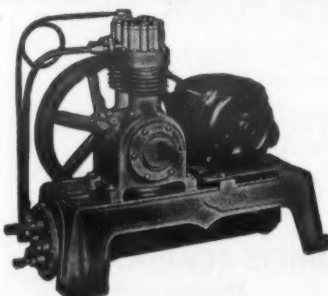


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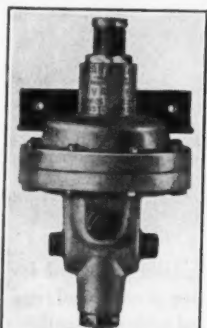
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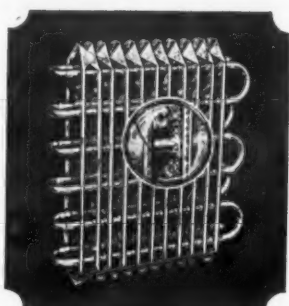
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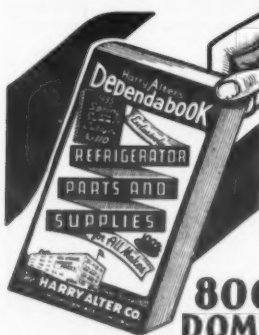


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Penn Switches Have Built-in Protection Against Overload

DES MOINES—Two new switches for temperature or pressure control, type LC and type LSC, with built-in thermal overload protection are now being manufactured by the Penn Electric Switch Co. for commercial refrigeration applications.

These new switches offer an economical and simple means of incorporating the overload protection feature, which, according to reports, will be obligatory by the Underwriters' Laboratories on all commercial refrigerators in the near future. By incorporating thermal overload protection, they eliminate the cost of separate and additional equipment, save time and expense in wiring, and conserve space.

Type LC and type LSC embody practically all the same features found in the company's line of type L refrigeration controls, with the addition of the built-in bi-metal overload protection. Type LC is for temperature or pressure control. Type LSC is for temperature or pressure control with combined safety cut-out to be connected to the high pressure side of compressors.

In a series of tests, bi-metal thermal overload protection has proved to have almost unlimited life, and to be more reliable than the old type solder-film, according to L. M. Persons, Penn's chief engineer. It will be used in the future not only in type LC and type LSC, but in all the company's new designs.

It offers a wider selection of trip-off temperatures, with resultant greater flexibility in the application, says Mr. Persons.

Adjustment of the overload feature may be made right on the job.

Bi-metal overload also lends itself to the compensated design in particular applications, but in type LC and type LSC it is not compensated because the switches are mounted in the same ambient temperature as the motor.

In addition to the bi-metal overload construction, type LC and type LSC offer a new trip-free reset mechanism. The contacts cannot be closed until pressure on the reset button is released. This prevents pushing in and locking the button by wire or other means when the switch is tripping out.

Indications are that this feature also will be obligatory by the Underwriters' Laboratories very shortly.

Type LC and type LSC have the same general appearance as type L and LS switches. The new pressed steel housing is used instead of cast-iron, as in previous similar controls, but is interchangeable with former cast-iron models.

The pressed steel cover breaks over the top of the switch, and the wiring connections are so arranged that service men may enter the switch from the top and make any adjustments right on the job with utmost convenience.

The internal mechanism of type LC and type LSC remain the same as in type L, with the exception of the built-in bi-metal overload protection. High speed make and break contact action is given by the Penn magnet structure, with special silver contacts to insure freedom from any contact troubles. The contact structure and the overload protection mechanism are mounted on a single dielectric fibre block. All metal parts have been specially treated to resist rust and corrosion.

Electric ratings of the new models are the same as previous type L switches—ac. 1 hp., single phase, d.c. 1/2 hp. Pressure connections, too, are the same—1/4-in. male S.A.E. or I.P.T. or 1/2-in. male I.P.T. Same style temperature bulbs also are used.

Melchior Booklet Covers Replacement Parts

NEW YORK CITY—A new booklet designated as Refriguide No. 1235 was recently issued by Melchior, Armstrong, Dessau Co., Inc., of this city. The booklet covers replacement parts for Frigidaire and Kelvinator compressors.

Capacity Tables on New Westinghouse Units

Model No.	Cooling Medium			Capacities in B.t.u.'s Per Hour			
	Air: 90° F.			Refrigerant Temperature			
	Water: 75° F.	R.p.m.	Hp.	40° F.	20° F.	5° F.	-10° F.
AFJ-100L	Air	480	1	.....	.....	5,300	3,390
AFJ-100S	Air	410	1	.....	6,600	4,580	3,000
AFJ-100H	Air	320	1	7,950	5,610	.....	.....
WFJ-100L	Water	480	1	.....	.....	5,925	3,980
WFJ-100S	Water	410	1	.....	7,350	5,030	3,240
WFJ-100H	Water	350	1	9,625	6,270	.....	.....
AFK-150L	Air	410	1 1/2	.....	.....	8,000	5,505
AFK-150S	Air	350	1 1/2	.....	9,250	6,915	5,080
AFK-150H	Air	270	1 1/2	10,500	7,610	.....	.....
WFK-150L	Water	480	1 1/2	.....	.....	10,350	7,065
WFK-150S	Water	400	1 1/2	.....	12,100	8,455	5,560
WFK-150H	Water	320	1 1/2	14,920	10,055	.....	.....
WFL-200S	Water	350	2	.....	16,600	11,418	7,300
WFL-200H	Water	380	2	20,550	13,500	.....	.....
WFM-300S	Water	460	3	.....	25,300	17,910	12,005
WFM-300H	Water	400	3	32,650	21,780	.....	.....

INSTALLATION OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN INSTALLATION WORK

No. 4—Making a Spring Bend, Using The Inside Spring

By K. M. Newcum

TOOLS NEEDED:

One inside bending spring (No. 4 screen door spring with paint removed).

MATERIALS NEEDED:

One piece of 1/2-inch tubing 18 inches long.

PROCEDURE:

1. Straighten tubing perfectly straight.
2. Insert bending spring into the tubing, making sure that the spring extends well beyond where the bend is to be made.
3. Mark the tubing where bend is to be made, and proceed to bend as you would with the hand bend (Lesson No. 3).
4. Bend the tubing a little beyond a 90 degree bend, then pull it back to 90 degrees. This will loosen the bending spring.
5. Remove the spring.
6. Check with instructor.

Note: Always provide some kind of a stop on the end of the bending spring to prevent it from sliding down into the tubing. This stop will also act as a handle on which to grip in removing the spring. BE SURE THAT THE INSIDE BENDING SPRING IS PERFECTLY DRY AND CLEAN BEFORE INSERTING IT INTO THE TUBING.

Detroit Announces New Safety Requirements For Installations

DETROIT—New requirements to be complied with in installation of refrigeration equipment, effective June 1, have been made public by H. H. Mills, chief safety engineer, Department of Buildings and Safety Engineering, City of Detroit.

The new requirements are as follows:

Each refrigerating system containing more than 10 lbs. of refrigerant shall be provided with an emergency line.

All soldered joints in systems containing more than 10 lbs. of refrigerant, shall be fabricated with material having a fusing point of not less than 1,300° F., including emergency lines.

In systems containing 10 lbs. or less of refrigerant, A.S.T.M. type "L" copper piping is permissible, the same to have a minimum wall thickness of .035 in.

In systems containing more than 10 lbs. of refrigerant, A.S.T.M. type "K" piping shall be used throughout. A.S.T.M. schedule No. B-88-33 shall be followed in determining the wall thickness of the various pipe sizes.

Permits shall be taken out for all commercial, industrial, and multiple installations.

All permits shall show pipe diameter as well as wall thickness.

Bonney Makes New Line Of Service Wrenches For Refrigerators

ALLENTOWN, Pa.—A new line of wrenches, designed especially for work on electric refrigerators, has been introduced by Bonney Forge & Tool Works.

Flare nut and switch adjusting wrenches of various styles, and ratchet wrenches for refrigerant cylinders, shut-off valves, compressors, and motors are included.

An assortment of packing nut and valve stem keys are also included in this new line.

McCord Refrigeration PRODUCTS

COMMERCIAL EVAPORATORS

DOMESTIC EVAPORATORS

CONDENSERS

METLFLEX ICE TRAYS

SPIRAL FINNED TUBING

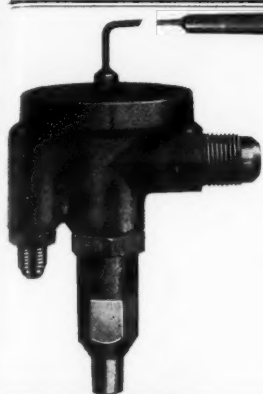
SPIRAL COPPER FINNED IRON, STEEL OR COPPER PIPE

McCord Radiator & Mfg. Co. DETROIT

BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE
TO THE REFRIGERATION INDUSTRY

SPECIAL ADVERTISING RATE (this column only)—\$12.00 per space.
Payment is required monthly in advance to obtain this special low rate.
Minimum Contract for this column—13 insertions in consecutive issues.



PEERLESS THERMAL EXPANSION VALVES

for Methyl Chloride, Sulphur Dioxide, Freon, and Ammonia

1. No bellows to leak.
2. No possibility of moisture condensation interfering with valve action.
3. Tried and proven in every section of the country.
4. Competitively priced.

PEERLESS ICE MACHINE CO.
CHICAGO TWO FACTORIES NEW YORK
515 W. 35th St. 43-00 36th St., L.I.C.

QUESTIONS

Corporate Histories

No. 2221 (Service Man, New Jersey)—“Do you have a list of makers of household electric refrigerators who have ceased active production or gone out of business during the past five years or less? Would very much appreciate any information along this line.”

Answer: The corporate history of companies which at one time manufactured household electric refrigerators and are now no longer active was published in the September 5, 1934 issue of ELECTRIC REFRIGERATION NEWS. Copies of this issue are available at the single-order rate of 10 cents each.

Refrigerator Trucks

No. 2222 (Dealer, Illinois)—“We wrote you April 12 in reference to writing us the names of several manufacturers who make a standard cabinet truck for our delivery department for handling electric refrigerators, radios, etc., similar to the one sold by the American Steel Scraper Co. at Sidney, Ohio.”

“Today we received a letter from Commercial Car Journal giving us the names of firms making truck bodies which is not the item we want.”

Answer: See advertisements of manufacturers of refrigerator handling equipment in this issue.

Refrigerator Cabinets

No. 2223 (Service company, Illinois)—“We would appreciate it very much if you would kindly furnish us with names of manufacturers of refrigerator cabinets.”

“We are in the market for these from time to time, and can use 4, 5, and 6 cu. ft. sizes, closeouts, samples, cabinets with slight imperfections, etc.”

Answer: Manufacturers of cabinets for household electric refrigerators are listed on pages 226 and 227 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Information on Guarantees

No. 2224 (Distributor, Iowa)—“Our wholesale men tell us that you have available for distributors' use, copies of guarantees by Westinghouse, Grunow, General Electric, and other refrigerator manufacturers.”

“Kindly send us about 25 of each. Also please send us about three copies of the issue which contains a comparison chart showing practically all models manufactured.”

Answer: We do not have available for distribution copies of the guarantees provided by the various refrigerator manufacturers, but the specifications data in the March 20 issue of ELECTRIC REFRIGERATION NEWS gives information as to the nature and time limit of the guarantees for the various makes.

Carrene Data

No. 2225 (Dealer, Indiana)—“We should appreciate very much your advising us of the chemical symbol, characteristics, and formulas of Carrene.”

Answer: Information concerning the chemical symbol, characteristics, and formulas of Carrene may be found in the following issues of ELECTRIC REFRIGERATION NEWS:

1. Dec. 7, 1932, issue, page 4 (this was the first story published about the Grunow refrigerator).
2. Feb. 21, 1934, issue, page 16 (discussion of various refrigerants).
3. Sept. 26, 1934, issue, page 11, and Oct. 10, 1934, issue, page 10.

Majestic Parts

No. 2226 (Dealer, Georgia)—“We are advised by W. D. Alexander Co., Atlanta, that you could furnish us with the name of the party who could render satisfactory service on a Majestic electric refrigerator.”

“We will thank you to advise us the name of some party with whom we could take up regarding the exchange of the power unit for Majestic electric refrigerator.”

Answer: Parts and service information on the Majestic household electric refrigerator may be obtained by addressing:

Mr. Frank M. McKee, Trustee
Grigsby-Grunow Co., Inc.
5801 Dickens Ave., Chicago, Ill.

Data on Household Makes

No. 2227 (Reader, Nebraska)—“I am seeking information on electric refrigerators. I am concerned with the type of refrigerant used, construction of box, uniformity of temperature within the box, and insulation used. I am also principally concerned as to the cost of operation of the more leading makes such as Grunow, General Elec-

tric, Westinghouse, Kelvinator, and Frigidaire.

“I would also appreciate receiving information on gas stoves such as the Monarch, Detroit Jewel, Roper, and Magic Chef.”

Answer: Complete specifications of all leading makes of household electric refrigerators were published in the March 20 issue of ELECTRIC REFRIGERATION NEWS.

The News has not published data dealing with the comparative cost of operation of the various makes, but there is a story on page 1 of the May 8 issue which gives information in general concerning the cost of operation of a household electric refrigerator.

For information on gas ranges we suggest you write their manufacturers.

Steinmetz Statement

No. 2228 (Advertising agency, Ohio)—“I have been trying to run to earth a statement that was supposed to have been made by the famous G. E. Steinmetz that automatic refrigeration belonged to the gas industry.”

“I am now in receipt of a letter from my friend Mr. Mateer of Electrical Merchandising that an article on this much disputed statement appeared in an issue of your publication not so long ago.”

“From your company I have obtained bound copies of ELECTRIC REFRIGERATION NEWS, which I have diligently searched from cover to cover, trying to locate the article in question.”

“Would you please be kind enough to give me the date of the issue that I am seeking?”

Answer: Information regarding the statement of the late Dr. Steinmetz on automatic refrigeration with relation to the gas industry is given in two letters published in the June 13, 1934, and July 18, 1934, issues of ELECTRIC REFRIGERATION NEWS.

Glass Traps for Ice Boxes

No. 2229 (Manufacturer, Ontario)—“Our inquiry of the 16th had reference to glass traps for use on ice refrigerators and not trays or dishes for the electric boxes. If you have any idea where any such tray can be purchased we will be glad to have information.”

Dealers' Association

No. 2230 (Dealer, New York)—“Will you please advise me if there is a National Association of Retail Electrical Dealers. If so, where are they located?”

Answer: We do not know of the National Association of Retail Electrical Dealers.

Trade associations of the refrigeration, air-conditioning, and allied industries are published starting on page 37 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Carbon Dioxide Data

No. 2231 (Manufacturer, Manila, P. I.)—“This company intends to manufacture carbon dioxide obtained from the fermentation of molasses. Our alcohol distillery has a capacity of 5,000 gallons a day. We shall be glad to receive from you any literature regarding this subject not only in the matter of the manufacture of the product, but also in connection with problems related with its application and distribution. One of the difficulties that we foresee is the fact that our distillery, located at Fabrica, Negros Occidental, is quite distant from the city of Manila which is the biggest consuming and distributing center of the Philippines. Any information and advice that you may favor us will be greatly appreciated.”

Answer: We are not sure whether you have reference to carbon dioxide gas or to solid carbon dioxide, which is used for refrigeration purposes.

For information concerning carbon dioxide gas we suggest that you write to Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago, Ill.

Concerning solid carbon dioxide, a bibliography giving selected references on solid carbon dioxide has been compiled by V. A. Pease, Food Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture. It includes a large number of sources of information on this subject.

Congeeing Solutions

No. 2232 (Ice cream shop, Illinois)—“One of our friends has suggested that you may be able to give us the names of distributors or manufacturers of different types of congealing solutions to use in place of calcium chloride brine.”

Answer: Congeeing solutions to be used in place of calcium chloride brine are manufactured by the following companies:

Kold-Hold Mfg. Co.
Olds Tower Bldg., Lansing, Mich.
Schurtz System Mfg. Co.
2127 Washington Blvd., Kansas City, Mo.
Walworth System, Inc.
227 Military Road, Buffalo, N. Y.

CLASSIFIED

RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

WANTED by Air Conditioning Manufacturer—Sales Engineers experienced in making complete estimates and equipment selections and assisting in the sale of direct expansion air conditioning equipment. Only those having above experience will be considered. Box 686, Electric Refrigeration News.

REFRIGERATION Engineer familiar with commercial compressors, coils, display cases, coolers, etc. Capable of running tests, installations of various refrigerants and multiple hookups. With reliable concern. Box 687, Electric Refrigeration News.

POSITION OPEN for a commercial refrigeration application engineer, familiar with all types of applications, laboratory and field test procedure and who also possesses a thorough knowledge of engineering. Send full particulars relative to education and past experience. Our employees have been advised of this ad. Box 688, Electric Refrigeration News.

POSITIONS WANTED

AT PRESENT employed as sales manager, showing big increase in sales but seeking a better opportunity; have national acquaintance and background, both wholesale and retail, obtained with country's foremost manufacturers of major household appliances; my experience includes direct-to-consumer merchandising methods; am 39 years of age, capable of managing national sales for a medium size concern or as field assistant for a larger one. Box 689, Electric Refrigeration News.

FRANCHISE AVAILABLE

WANTED, DISTRIBUTORS—Wanted, district distributors to sell to retail trade exclusively, new and reconditioned electric and gas refrigerators of nationally known makes, at greatly reduced prices; fully guaranteed. Full protection to territory rights. For domestic and export trade, catalogues, prices and specifications on request. Wanted, resident buyers to purchase for us in quantities, old and new refrigerators. Exclusive territory. Interstate Refrigerator Corp., 96 Fifth Ave., New York, N. Y.

EQUIPMENT FOR SALE

ATTENTION: Dealers and Service Men—Rebuilt Mayson Expansion Valves, \$1.00. Rebuilt American Radiator Expansion Valves, \$1.65. Fully guaranteed. Also Ranco controls, type DH and others, \$1.95. Other surplus, miscellaneous parts in stock, such as legs, shelves, porcelain evaporator baffles, at ridiculous prices. Hundreds of fully reconditioned, nationally-known refrigerators, priced right for retail re-sale. Federal Refrigerator Corp., 437 Eleventh Ave., New York, N. Y.

ISOBUTANE: We offer purest and dryest isobutane for the most exacting scientific purposes; in your 80 lb. cylinders at \$0.75, in our 120 lb. cylinders, \$0.70, in small lots at \$1.00 per pound. The Standard Refrigeration Co. of Pittsburgh, 1148 Dohrman St., McKees Rocks, Pa.

FIFTY Kelvinator Senior compressor bodies, flywheels and shut-off valves. All in good operating condition. Price \$9.00 each.

Seventy-five Kelvinator, 15 and 8 cu. ft. brine tanks in good condition with brine, ice-cube trays and grids. Price \$4.50 each. Refrigeration Maintenance Corp., 365 E. Illinois Street, Chicago

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

REPAIRS

HALECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn. Ranco, Tag, etc. Expansion valves repaired. Gas service, Ethyl, Methyl, Isobutane, Sulphur. Your cylinder or ours. Competitive prices. Halectric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

The Matheson Co.
EAST RUTHERFORD
N.J.

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METHYL CHLORIDE
ISOBUTANE
ETHYL CHLORIDE
AMMONIA
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REFRIGERATOR OILS

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FAN-E-FEX Diffusing Units
HUM-E-FEX Non-Dehydrating Coils
AIR-E-FEX Air-Conditioning Units

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H. J. KRACKOWIZER, Pres.
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V-BELTS

There is a Dayton V-Belt made especially for all makes and types of refrigerators, washing machines and other appliances. A stock is available near you. Send for price list and name of your nearest distributor.

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Pipe Coils and Bends Send for catalog, price list and sample

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for
FREEZER CASES
ICE CREAM CABINETS
WATER COOLERS

PARKER MANUFACTURING CO.
2625 Santa Fe Ave.
LOS ANGELES, U. S. A.

DOMESTIC COOLING UNITS

Manufactured in sizes from 2 to 8 trays direct expansion type. Ideal for the assembler of Household Refrigerators or for replacements.

Attractive Prices

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1620 Harmon Place Minneapolis, Minn.

A convenient way to keep your back issues of the News

We offer a binder designed and made especially for keeping your file copies of Electric Refrigeration News neat and always available for ready reference. It is made of stiff board covers, attractively bound in good quality of black imitation leather. The name Electric Refrigeration News is stamped in gold on the front cover and backbone.

The price is \$3.75 shipped to you post paid in the United States and Possessions and Pan-American Postal Union countries. For all Foreign countries, postage based on a shipping weight of 6 pounds must be added to this price. Send your remittance with order. May we send you one?

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.